Antiquity

A Quarterly Review of Archaeology

VOL. XII No. 46 JUNE 1938

Editorial Notes

MANY times already we have discussed Museums in these notes. We almost hesitate to return to this subject, for fear lest our readers may be bored ; but it is one of such outstanding importance that the risk must be taken. For Museums are essential to the study of local history and antiquities ; and without such there can be no understanding of national culture. The museum should be the rallying-point of all who are interested in the history and prehistory of their home-region ; it should help students and inform the general public. Its charge is a whole-time job. Its activities should include excavation and publication, as well as the primary function of conservation, and should be closely linked with the *normal* syllabus of education.

We shall describe and illustrate one of the functions successfully performed by museums in Germany, where they flourish as nowhere else, in the hope that the description may be found helpful and suggestive. We would gladly have selected examples from nearer home, had such been available. That must not be taken to imply that we have no good museums in Great Britain ; we have a few, whose excellence is due to the efforts of individuals rather than to official encouragement. Those who delight in odious comparisons are recommended to inspect the museums of Cologne, Kiel, Halle and Bonn, and the corresponding institutions in, say, Southampton, Portsmouth and Bournemouth. The comparison is a fair one, whatever standard be adopted.

The Halle Museum authorities are responsible for two excellent illustrated posters aimed at the preservation of antiquities brought to light accidentally. The first (page 131) is concerned with the discovery of museum-objects, such as burial-urns, made in the course of some industrial operations. August Tropf (the equivalent of Bill Sykes) finds a cinerary urn (FIG. 1) and immediately smashes it in hope of treasure (2). Finding it contains only ashes and bones (3) he walks away in disgust (4), leaving the broken sherds to be discovered by his better-informed comrade, Klug (5), who collects them and takes them to the Clerk of the Works (6). He then carries them off to the museum, where they are laboriously put together by the official pot-mender (7); the urn is shown restored (8), and the site is reserved for excavation (9). August reaps his well-earned reward, not a fortune but 'Zigarre und 'nem gut Glas Bier' (10). Meanwhile the official excavator, Doktor Faust, is rapidly mobilized (11, 12), and gets to work on the site with the implements of his trade, recovering another urn from the cemetery site, this time intact (13, 14). It is triumphantly displayed, with the information that it was discovered during the construction of a Reichsautobahn (15); which may be regarded as the equivalent of a national arterial road. Prominently displayed at the foot is the *immediate action* to be taken in such cases—leave the finds undisturbed and immediately ring up the proper authorities, Halle 25851.

It should be noted that the provincial town of Halle contains two authorities which are concerned with such matters, the Museum and a body which has no equivalent in this country, the Landesanstalt für Volkheitskunde. It should further be noted that the Museum has on its staff as a matter of course both a pot-mender and a qualified excavator.

The second poster (page 133) seeks to enlighten the workman about the meaning and importance of such finds as prehistoric house-remains and burials. The illustration shows (top right) a gang of men at work on a Reichsautobahn. On the left are shown, diagrammatically of course, the plan of a wooden house, indicated by marks of post-holes and a stone-set hearth, and in the middle a stone burial-chamber with peristalith. Below are shown the restorations, with the added explanation in words—What do these finds signify? The homes and graves of

Bogen 1.

1. Bei Erdarbeit stößt August Tropf
Soeben hier auf einen Topf.

2. „Das muß doch wohl ein Geldtopf sein"
Sagt er, „drum han ich tüchtig drein!"

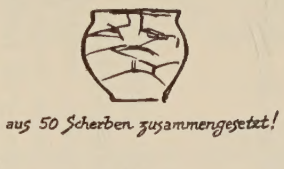
3. O weh, es gibt hier nichts zu erben,
Es sind nur Asche, Knochen, Scherben.

4. Und August Tropf voll Mißvergnügen
Läßt diese Scherben einfach liegen.

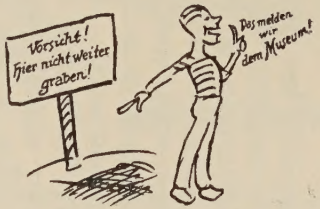
5. Da kommt herbei sein Kamerad Klug:
„Auch Scherben sind noch Wert genug!"

6. „Die muß man doch vor allen Dingen
Zunächst zu dem Museum bringen!"

7. Da seht Ihr nun, wie man sie setzt
Mit List und Leim zusammensetzt.



8. Das Geld, das dafür aufgewendet,
Das hätt man gerne Euch gespendet.



9. Wenn Ihr die Funde sorgsam schont,
So wird gewiß das auch belohnt.

10. Nicht daß Ihr werdet Millionär. —
Wo sollt man's Geld auch nehmen her? —
Doch reicht's bestimmt, das seht Ihr hier,
Zur Zigarre und 'nem gut Glas Bier.

11. Nun schnell ans Telephon! —
Bitte Museum — Hat ihm schon!
Halle 25851.

12. Ihr seht, hier kommt der Doktor Faust
Rasch vom Museum angesaust.

13. Mit Instrumenten und Bedacht
Er sich gleich an die Arbeit macht.

14. Stolz hält er hin der Mühe Lohn
Und nun erzählt er Euch davon:
Was er sagt dabei
Das findet Ihr auf Bogen zwei.

15. Und im Museum glanzt das Stück
Ein jeder ruft: „O welch' ein Glück!"
Wo fand man es?
Auch das steht dran:
Gefunden bei der Reichsautobahn.

Jeden Fund unberührt liegen lassen und sofort dem nächsten Museum oder der Landesanstalt für Volkheitskunde in Halle melden! Der Staatliche Vertrauensmann, Fernsprecher Halle 25851.

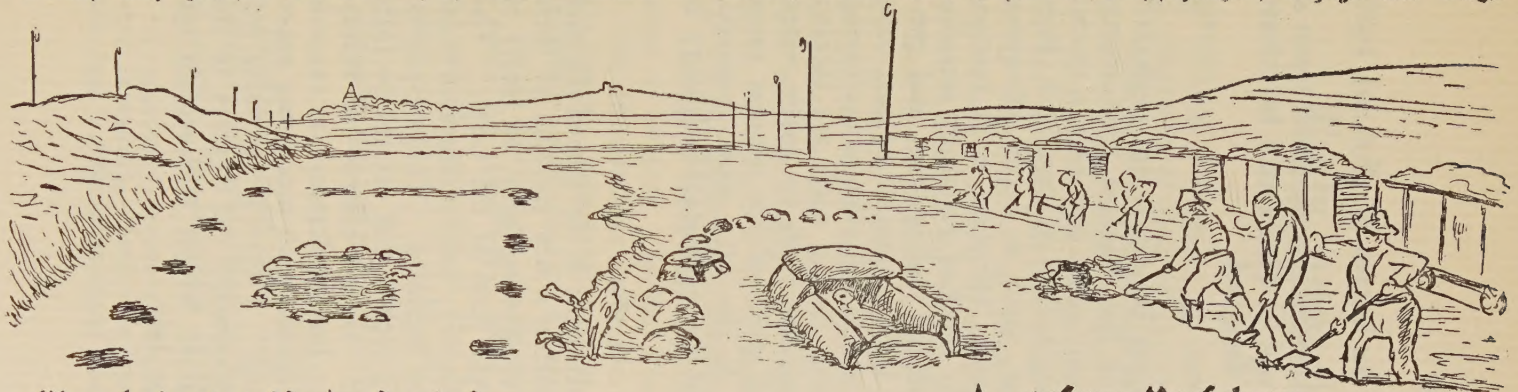
our ancestors. At the top the workman is told what to look for—Dark marks in the soil, animal-bones, potsherds, stone-settings, pots and such like things.

A more comprehensive pamphlet has been produced by the Reichs- und Preussischen Ministerium für Wissenschaft, Erziehung und Volksbildung, under the editorship of Dr Buttler, of Köln-Lindenthal fame. It covers the same ground as the leaflets, but is able to give more detailed information about various kinds of antiquities. The first two pages explain their importance as documents from which, and which alone, prehistory is constructed. All such finds should therefore be carefully preserved ; excavation is a skilled task that should only be carried out under expert supervision. Objects of scientific importance should be given to the museum (Gemeinnutz geht vor Eigennutz). Information about such matters should be diffused as widely as possible.

The pamphlet illustrates and explains the character of certain common antiquities, such as Hünengraber (' dolmens ', or burial-chambers, and megaliths in general), with examples of how not to treat them. Do not, for instance, build your pigstye upon a chambered barrow, as did an unenlightened farmer of Steinbeck (illustration given). Do not use the ramparts of camps as stone-quarries (as was done at Müllenborg), or allow pigs to destroy them by rooting up the surface (as at Gross Wechsungen). The prehistoric chieftain of Aschersleben never dreamt that on his grave-mound a memorial to Bismarck would be set up ; nor would the founder of the Second Empire have approved.

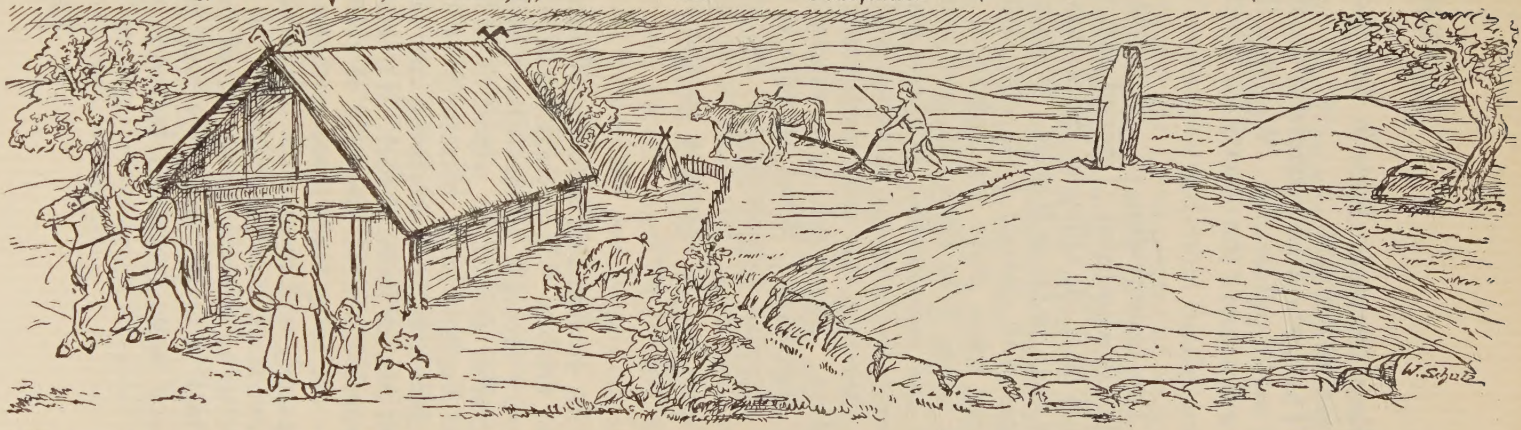
There follow illustrated examples of the technique of proper excavation and conservation, of the visible signs of ancient remains (post-holes, pits in the sides of a quarry, dark occupation-layers in the soil), Roman roads and buildings, typical objects of the Bronze and Iron Ages. The importance of microscopic and chemical examination is illustrated. Finally there are two pages describing some of the purposes served by the careful preservation of minor objects : each has its place on a distribution-map, which itself leads to fresh knowledge. As an example there are given three sketch-maps of Silesia illustrating

Worauf muß geachtet werden?: Auf dunkle Stellen im Boden, Tierknochen, Scherben, Steinsetzungen, Gefäße und dergl.



Was bedeuten die ↕ Funde? ↕ unserer Vorfahren

Siedlung, Haus und Hof, und Grabstätten



Jeden Fund unberührt liegen lassen und sofort dem nächsten Museum oder der Landesanstalt für Volkheitskunde in Halle melden! Der Staatliche Vertrauensmann, Fernsprecher Halle 25851.

the Early Germanic finds in that province as known in 1896 (9), 1926 (52) and 1937 (147).

The authorities concerned are to be heartily congratulated upon a most useful publication. We hope that it will be distributed broadcast and will achieve the objects for which it is designed.

The conservation of antiquities in Great Britain is not neglected by the Government; indeed the work of the Ancient Monuments Branch of H.M. Office of Works has for many years past been a model of its kind, so far as it goes. What is lacking here is an organized effort to deal with chance finds and destruction, such as occur whenever digging takes place for industrial purposes. Hitherto such rescue-work as has been done has been mainly the work of voluntary associations and individuals. Without proper official endowment, and consequently without the qualified staff, our local museums cannot cope with situations that arise continually, and which will arise in increasing numbers. Moreover, even museums worth calling such are lacking over large areas. What happens is that valuable finds are made, often duly reported (for intelligent interest and goodwill are present more often than not); but there is no one to do the s.o.s. work required, the work has to continue on the site and its irreplaceable history is destroyed for ever.

An outstanding instance of such destruction is the gravel-digging round Oxford. It is tragic that, often within a few months of their recovery through Major Allen's brilliant air-photography, so many of these sites should be wiped literally off the face of the earth. The soil of England is the manuscript of its prehistory; once obliterated these priceless original documents can never be replaced. The air-photograph (where there is such) is a tantalizing record that cannot be fully interpreted without the help of excavation. Heroic efforts—all voluntary—are being made to salve what may be; but the demand far exceeds the supply and meanwhile destruction advances with increasing speed as mechanical methods expedite the fell work. Future generations will curse us as heartily as we curse our predecessors for neglect of the national heritage, and they will bless those whose enthusiasm has rescued some fragments before it was too late.

Early Agriculture in Denmark[1]

by E. Cecil Curwen

THERE is perhaps no branch of archaeology of more fundamental importance than the study of the rise and development of agriculture, seeing that it has been the governing factor in the Natural History of Man from the time of its introduction down to the Industrial Era. But the study of the evidence from Britain is not enough; hence Professor Hatt's full and clear exposition of the Danish evidence is of special importance to British archaeologists, seeing that the rich discoveries preserved in the peat-bogs of Denmark can supply details that are missing in the British picture, or at least suggest to us directions in which future research may profitably be pursued. Professor Hatt's wide knowledge and balanced judgment—not to mention his delightful personality—have won the confidence and respect of those British archaeologists who have had the privilege of knowing him, and his recent book on Danish agriculture is far too important to be left in the relative obscurity of the Danish language. Hence a brief summary of its principal contents is attempted here.

Denmark itself has undergone physical changes, due largely to change of climate. In the Neolithic and Bronze Ages (say, 3000–500 B.C.) the climate was warm and dry, and the country was largely clothed with forest; this consisted at first mainly of conifers with an ever-increasing proportion of deciduous trees. With the Iron Age a colder and wetter period set in, accompanied by the gradual replacement of the forest by open heath with growth of heather. Since the immigrations which brought in the Neolithic culture the population of the country is said not to have undergone any considerable modification as regards blood or race, but has been culturally influenced from outside its borders, and has more than once been the source of emigrations.

Cultivated Plants

Between about 9000 and 3000 B.C. Denmark was inhabited by Mesolithic folk who lived by hunting and collecting the edible parts of wild plants. In deposits of the Mullerup culture (about 6000 B.C.)

[1] A summary of Gudmund Hatt, *Landbrug i Danmarks Oldtid* (Copenhagen, 1937); and Axel Steensberg, 'North-west European Plough-types of Prehistoric Times and the Middle Ages', *Acta Archaeologica* (Copenhagen, 1936), VII, 244–280.

there is evidence that, besides game, certain wild plants and trees were staple sources of food-supply. These include hazel-nuts, seeds of the yellow water-lily, berries such as currants, raspberries, cherries, sloes, hips, haws, rowan-berries, bilberries, cowberries, blackberries, strawberries, together with crab-apples, vetches and dandelion. By way of comparison, certain central Australian food-gathering tribes of the present day have names for 62 wild food-plants, and the Polish botanist, A. Maurizio, has listed some hundreds of such plants that are indigenous in the countries of the north Temperate Zone, and has shown that 446 wild food-plants are known from ancient custom and use among civilized peoples there.

The cultivation of corn and the domestication of animals appear in Denmark at the beginning of the Neolithic period, about 3000 B.C. Though there is no essential connexion between these two activities, they both appear simultaneously in northwest Europe ; on the other hand, pottery had been found in the Ertebølle shell-mounds, before the arrival of any cultivated plants.

Thanks largely to the researches of Georg F. L. Sarauw and Knud Jessen, the list of plants cultivated in prehistoric Denmark is second only to that from the Alpine lake-villages. Sarauw searched for impressions of seeds on the surface of all the pottery found in Denmark, and was able therefrom to identify the plants concerned. His results, which he never lived to publish, are extremely valuable, for we in Britain can reasonably expect to arrive at similar results for our own country if similar methods are pursued. From pottery of the various periods Sarauw obtained the following results :

(*a*) *Neolithic*	No. of discoveries	No. of impressions
Einkorn wheat (*T. monococcum*)	2	21
Emmer wheat (*T. dicoccum*)	40	288
Dwarf or common wheat (*T. compactum* or *vulgare*)	24	46
Naked barley (*Hordeum coeleste*)	26	40
Husked barley (*H. vulgare*)	7	14
Bistort (*Polygonum*)	3	3
Apple	6	13

Taking the number of impressions of grain as indication of the relative proportions of wheat and barley cultivated during the Neolithic period, we find that 86.8 per cent. was wheat, and only 13.2 per cent.

was barley; moreover, of the wheat no less than 81 per cent. was Emmer, while the husked barley, to which modern varieties are related, forms only a quarter of the total barley.

(*b*) *Early and Middle Bronze Age* (1500–800 B.C.)

	No. of discoveries	No. of impressions
Husked barley	1	2
Bistort (*Polygonum*)	1	2

The poverty of finds in this period is explained by the rarity of pottery.

(*c*) *Late Bronze Age* (800–400 B.C.)

	No. of discoveries	No. of impressions
Emmer wheat	5	13
Dwarf or common wheat	9	9
Naked barley	68	108
Husked barley	53	104
Millet (*Panicum miliaceum*)	6	5
Oats (*Avena sativa*)	3	4
Wild oats (*Avena fatua*)	2	3
Bistort	19	25
Pea	2	2
Bean (*Vicia faba*)	1	1

We now find the relative proportions of wheat and barley reversed: barley forms 87 per cent. of the total grain, and wheat only 9 per cent.; husked barley is beginning to catch up the naked variety, but Emmer still predominates among the wheat. We now have two new grains appearing, viz. millet and oats, each forming about 2 per cent. of the whole. Millet, of which two actual grains have also been found in a bronze vessel belonging to the Late Bronze Age, requires a warmer climate than that which has prevailed in Denmark during historic times.

(*d*) *Pre-Roman Iron Age* (400–1 B.C.)

	No. of discoveries	No. of impressions
Dwarf or common wheat	1	1
Naked barley	7	25
Husked barley	5	5
Millet	1	1
Bistort	25	123

The totals here are too small to draw reliable conclusions from them. We note, however, that barley—especially the naked variety—is still by far the commonest grain, and that millet is still found. The high proportion of *polygonum* suggests the possibility that this weed may have been cultivated.

(*e*) *Early Roman Iron Age* (A.D. 1–200)

	No. of discoveries	No. of impressions
Dwarf or common wheat	4	4
Naked barley	37	60
Husked barley	57	133
Oats	16	32
Rye (*Secale cereale*)	8	11
Wild oats	2	7
Bistort	29	56
Pea	1	1

Once more barley is predominant, forming 80 per cent. of the total cereals, but now it is the husked variety in the proportion of more than two to one over the naked. Wheat, from which Emmer has finally disappeared, forms less than 2 per cent. of the total, while the proportion of oats has risen to 13 per cent. Rye appears for the first time, and accounts for about $4\frac{1}{2}$ per cent. of the whole. Once more we note the prominence of the weed *polygonum*, which can scarcely be accidental.

(*f*) *Later Roman Iron Age* (A.D. 200–500)

	No. of discoveries	No. of impressions
Dwarf or common wheat	4	6
Naked barley	16	40
Husked barley	41	149
Oats	13	13
Rye	9	15
Wild oats	2	2
Bistort	22	45
Flax (*Linum usitatissimum*)	2	17
Bean	2	?

This list resembles the preceding ; barley forms nearly 85 per cent. of the total cereals, and the husked variety is now nearly four times as

common as the naked. Wheat forms less than 3 per cent. of the whole, oats nearly 6 per cent., and rye nearly 7 per cent. *Polygonum* is still prominent, and flax appears for the first time.

Pottery from the post-Roman Iron Age (A.D. 500–1000) is rare, and therefore not more than a dozen impressions of seeds have been found. These consist of barley, rye and the inevitable *polygonum*.

It is noteworthy that the warm-loving wheat was in the ascendancy during the warm sub-Boreal period, and that in the colder and wetter phase of the Early Iron Age it was not only replaced by the hardier barley, but also by oats, which was originally a weed infesting Emmer wheat, and by rye, which was also a weed—both oats and rye being capable of standing a more rigorous climate than wheat.

There is reason to think that certain native wild plants may also have been cultivated in Denmark. We have noted the remarkable frequency of the occurrence of *polygonum* seeds in the foregoing lists ; of these the pale-leafed bistort is the commonest (*Polygonum tomentosum*), but *P. persicaria* and *P. convolvulus* also occur. The seeds of this last were used for making porridge in Germany as late as the last century, and in Russia and Sweden have been used for fodder, and even for distilling instead of grain. *Polygonum* seeds have also been found in quantities in the Swiss lake-dwellings.[2] Knud Jessen has also shown that the white goosefoot (*Chenopodium album*) was probably cultivated early in the Bronze Age ; the leaves have been used in historic times as cabbage, and the seeds have been ground with corn for bread, but have a certain laxative effect.[3]

Sarauw's researches have since been augmented and confirmed by discoveries of quantities of carbonized grain and other seeds in carefully excavated dwelling-sites. In one of these, dating from the Roman Iron Age, a collection of nearly half a pint of the oleagenous seeds of ' gold of pleasure ' (*Camelina sativa*) was found in the bottom of a large jar of 9 gallons capacity. This plant is a weed in fields of flax, but was actually cultivated as early as the Neolithic period in Hungary, and was used for flavouring bread as late as the 18th century in Denmark. The seeds contain 30 per cent. of oil, which can be used either as food or for light, and it is considered that it was cultivated in northern and western Jutland in the pre-Roman Iron Age.[4]

[2] C. P. Johnson, in *The Useful Plants of Great Britain*, pp. 218–222, gives a full account of the uses and recent cultivation of the different varieties of *Polygonum*.

[3] ibid. pp. 216–7.

[4] ibid. pp. 27–8.

Corn-spurrey (*Spergula arvensis*) was cultivated in the Iron Age, as it is today, for fodder.[5] Over a gallon of the carbonized seeds were found on the floor of a burnt house at Ginderup. Woad (*Isatis tinctoria*) was likewise cultivated in the Roman Iron Age for its blue dye.[6] It seems to have been known in south and west Europe earlier than in central Europe, and was cultivated in Scandinavia as late as the beginning of the 19th century.

Flax first appears in the pre-Roman Iron Age—a little earlier than Sarauw's lists indicated—and was certainly cultivated in the 1st century A.D.[7] Isolated finds of linen from the Neolithic and Late Bronze Ages were probably imported and not manufactured locally.

Altogether, the state of agriculture in northern Jutland during the Roman Iron Age was scarcely inferior to that of the beginning of the 19th century.

The story of agriculture in Denmark did not begin with the cultivation of native plants, but with the introduction of wheat and barley, and the principles of cultivation were afterwards applied to the native plants. While the pottery found in the shell-mounds of the non-agricultural Ertebølle folk shows no impressions of the seeds of corn or other cultivated plants, there is evidence that wheat and barley reached Denmark before the earliest megalithic culture. This evidence consists in the impressions of Emmer wheat and naked barley on two specimens of Neolithic pottery of pre-megalithic type. Curiously enough, of the two principal cultural elements that go to make up the Danish Neolithic—the megalithic folk and the battle-axe (or single grave) folk—the former cultivated little else but wheat, while the latter grew exclusively barley.

The probable ultimate source of cultivated wheat and barley is the Near East. Vavilov's[8] botanical researches indicate a mountainous country as the scene of the first cultivation of the wild prototypes of wheat : he classifies these in three groups, each with its centre of diffusion—(1) a group which includes Common wheat and Dwarf wheat, in Turkestan, Afghanistan and northwest India ; (2) a group including Emmer, in Abyssinia ; and (3) a group including Einkorn, in Asia Minor. Similarly he regards one group of barley-forms, mainly the husked kinds, as having its centre of diffusion in Abyssinia, and another, mainly the naked kinds, in the Himalayas and neighbouring parts of

[5] ibid. p. 53. [6] ibid. pp. 22–4. [7] ibid. pp. 54–7.

[8] See the article on 'The Origin of Cultivated Plants' by A. E. Watkins in ANTIQUITY, 1933, VII, 73–80.

China. Both groups include two-rowed and six-rowed forms. The early European varieties doubtless derive from the northeast African centre.

Oats first appear in central Europe and Denmark during the Bronze Age, and the Romans learnt to know it from the Celts and Germans. The cultivation of oats has probably arisen in different places at different times ; originally it appears to have been a weed in Emmer wheat, and being the hardier of the two it was better able to stand the climate of northern latitudes.

Rye first appears in central Europe at the end of the Bronze Age and beginning of the Iron Age, and, like oats, was originally a weed in wheat and barley fields, spreading, according to Vavilov, from diffusion-centres in Asia Minor, Persia and Armenia. The rigors of a northern climate gave to rye also an advantage over wheat, as in the case of oats, so that it gradually became an independent cultivated plant. This may have been promoted by the ancient habit of sowing two or more different crops in the same field together, in order to insure against failure of one of them.[9]

The earliest cultivation of flax took place in north Africa and southwest Asia, and it is to the latter group that the European forms belong, having a distribution over north India, Afghanistan and Bokhara.

Domesticated Animals

The bones of animals found in Mesolithic settlement sites of the Mullerup culture (say, 6000 B.C.) show that man was dependent for his living on wild animals such as the red deer, roedeer, elk, urus, wild boar, beaver, badger, pinemarten, wild cat, fox and hedgehog, and on such birds as the grey duck, grebe, shoveller (*Anas clypeata*), coot, crane, cormorant, sea-eagle, and black stork. The only domesticated animal at this period is the dog, of which two kinds can be recognized, a large and a small. Later on, in the Ertebølle middens, dog-bones are common, and the bones of other animals show marks of gnawing by dogs. According to Herluf Winge the domesticated dog reached Denmark from the south, and was not developed locally but from the wild jackal such as is found in southeast Europe, Asia Minor and north Africa. Others consider that the Mullerup dog was derived from the wolf, or else from a cross between the wolf and a dog which was

[9] This custom is referred to in Leviticus, XIX, 19.

originally a domesticated jackal.[10] The earliest uses of the dog were for hunting, for guarding the house, and for food.

The domestic ox, pig, sheep and goat first appear in Denmark at the beginning of the Neolithic period, simultaneously with wheat and barley, and must have been introduced from the south. There was thus no purely pastoral stage preceding cultivation. In spite of many contrary opinions, which are based on misunderstandings of the evidence, there is no ground for believing that any domestic animals, except the dog, were known in Denmark before the arrival of agriculture at the beginning of the Neolithic period, nor is there any reason to think that local wild animals, such as deer, had been in any sense domesticated.

The Neolithic and Bronze Age sheep[11] was a small ' goat-horned ' variety, which is known from pictured representations of the 3rd millennium B.C. in Babylon. It is believed to have been domesticated in Turkestan about 6000 B.C. or rather later. The Neolithic goat belongs to a species which still lives in Crete[12] and is widely distributed in western Asia.

The domestic pig is derived from the wild boar which is native to Europe, north Asia and north Africa, and though its domestication could have taken place locally its sudden appearance in Denmark simultaneously with other domestic animals, and with all its characteristics fully developed, points to its having been introduced from elsewhere. Pigs are not good at travelling, and are therefore not much kept by nomadic peoples, but are essentially proper to settled farming communities. The similarity between wild boars and domestic pigs was greatest in the Neolithic period, since when there has been increasing divergence.

As to the origin of the domestic ox there is as yet no final agreement. It seems likely that at least two main groups are involved, derived from two principal sources : (1) to one of these groups belong the long-horned, broad-browed varieties, represented at the present day by the Scottish Highland cattle, and derived, no doubt, from the Urus (*Bos primigenius*) which was widely distributed in Europe, north Africa and the Near East ; (2) to the other belong the short-horned varieties with long and narrow foreheads (*Bos brachyceros*), of which the

[10] See the article on ' Dogs ' by Max Hilzheimer in ANTIQUITY, 1932, VI, 411–9. See also *Proc. Prehist. Soc.*, 1938, 469–70.

[11] See the article on ' Sheep ' by Max Hilzheimer in ANTIQUITY, 1936, X, 195–206.

[12] See ANTIQUITY, 1938, XII, 81 and photo.

ultimate source is uncertain, but of which the domestication presumably took place in Europe north of the Alps, or in western Asia. Both of these groups are represented among the cattle of the Danish Neolithic period.[13] Oxen were used for food and, at any rate from the Late Bronze Age, for ploughing ; presumably milk and cheese were also obtained for food, though this is not easy to prove. Certain perforated vessels, with one large additional opening in the centre, are looked upon as cheese-strainers.[14]

The origin of the domesticated horse is also rather uncertain.[15] It is usual to postulate two main groups : (1) the ' oriental ', or light, ' warm-blooded ' horse with short head ; and (2) the ' occidental ', or heavy, ' cold-blooded ' horse with long head. The first group includes the Arab horse, and is probably the older, while the second group is especially characteristic of the Baltic countries. The domestication of the horse most probably took place in the grass-lands of south Russia, where the Tarpan is still found. The domesticated horse seems not to have reached Denmark in the megalithic period,[16] though it may have been introduced by the battle-axe (single grave) folk ; it is common in the Bronze and Iron Ages. It was certainly used for food, and in the Bronze Age it was harnessed to carts, while during the Iron Age it was used, first for drawing war-chariots, and later for riding and hunting. The horse had no special connexion with agriculture, but rather with fighting and with religious cults, and seems to have been an object of sacrifice.

Poultry and cats appear first in the Roman Iron Age.

Agricultural Implements

Did the Neolithic Danes use a plough drawn by animal labour, or was cultivation done with hoes and digging-sticks ? Does the simultaneous arrival of corn and cattle imply that the latter were used for cultivating the ground ? Professor Hatt admits that there is no evidence to answer the first question, and he sees no reason to accept the validity

[13] In Britain the long-horned group is as characteristic of the Neolithic, as the short-horned group is of the Early Iron Age.

[14] A British specimen of the same type from Kingley Vale, Sussex, is illustrated in the present writer's *Archaeology of Sussex* (1937), p. 200, fig. 56.

[15] See the article on the ' Horse ' by Max Hilzheimer in ANTIQUITY, 1935, IX, 133–9.

[16] The horse seems also to have been unknown to the British Neolithic A folk in southern England. It is noteworthy that it did not reach Egypt till the Hyksos period (1780–1580 B.C.).

of the inference in the second. After all, corn and cattle were but two parallel methods of food-production, not necessarily inter-related in the way suggested.[17]

The study of early ploughs is largely based on the work of Professor Hatt's assistant, Axel Steensberg.[18] Instruments which we call ' ploughs ' are classified in two more or less distinct groups, the *ard*, and the plough (properly speaking). *Ard* is an old Scandinavian word for the light, two-ox plough, without mould-board or wheels, and may be cognate with the Latin *aratrum* and its congeners. ' Plough ' is a Teutonic word which is strictly applicable only to the heavy implement with mould-board and wheels, which, as we shall see, may well have been invented within the area where Teutonic languages are spoken.

The *ard* may be of two forms : the crook-*ard*, which is essentially an enormous hoe made out of a forked branch, dragged through the ground by the oxen, and steadied by the application of a stilt ; and the spade-*ard*, in which the stilt and share-beam are of one piece, shaped like a kind of spade or digging-stick, and dragged through the ground by the pole, to the hinder end of which it is firmly attached. Both types can be traced to Mediterranean lands, where the *ard* is still in common use,[19] and both are depicted on the Swedish rock-carvings. Such an instrument, as Steensberg aptly says, is rather like a harrow with one tooth.

The ancient ploughs of northwest Europe are nearly all *ards* of one type or the other. A crook-*ard* found in peat at Walle in Hanover has been dated on the ground of pollen-analysis to 3500 B.C., but as the peat-specimens were not taken from the plough itself, but from the bog at the level at which the peat-cutter said it had been found—three months after the event—this conclusion is worth very little.[20] Part of a spade-*ard* found in a bog at Svarvarbo in Sweden was similarly dated by pollen-analysis to the Early Bronze Age, and here again the specimen of peat examined was taken from the bog at a level pointed out by the finder thirteen years after its discovery—a circumstance which totally invalidates the conclusions drawn from the analysis.

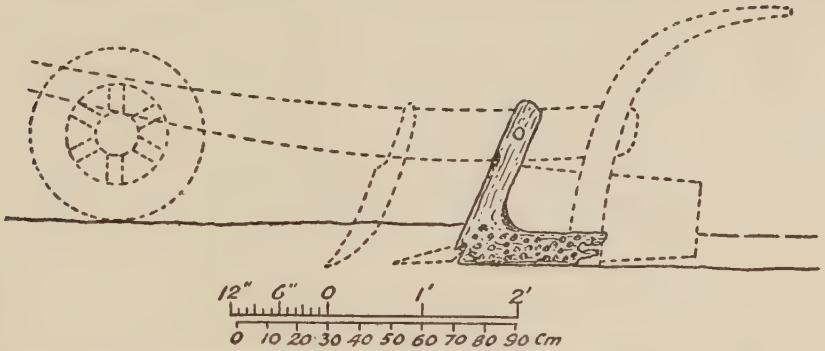
[17] See the article on ' The Origin and Early Diffusion of the Traction-plough ' by C. W. Bishop in ANTIQUITY, 1936, X, 261–81.

[18] *Acta Archaeologica*, VII, 244–280.

[19] Perhaps these two types correspond to Hesiod's ἄροτρον αὐτόγυον and ἄροτρον πηκτόν (*Works and Days*, 433).

[20] An amusing sidelight on the alleged antiquity of this plough is contained in the title of the original publication : ' Die älteste Pflug der Welt : in Deutschland ' (*Natur und Volk*, 1934, LXIV, 83–91).

A perfect specimen of a spade-*ard* found many years ago in a bog at Døstrup in Jutland (PLATE I) has recently been re-examined by Professor Knud Jessen, who found peat adhering to a crack in the wood, thus indicating its contemporaneity with the implement. Pollen-analysis of this peat indicated a date about the beginning of the pre-Roman Iron Age (say, 400 B.C.), which is a perfectly reasonable conclusion. The pole is a naturally curved piece of birch or alder which has been trimmed so as to be quadrilateral in section. At the fore end a wooden hook has been inserted for the attachment of the ox-yoke. The hinder, down-curved end of the pole is relatively heavy and is pierced by a square hole through which goes the lower end of the stilt,



PROVISIONAL RECONSTRUCTION OF FRAGMENT OF MOULD-BOARD PLOUGH DATED BY POLLEN-ANALYSIS TO THE BEGINNING OF THE PRE-ROMAN IRON AGE
(*after* Steensberg)

which forms the share-beam. In a groove along the upper side of the latter lies a small piece of wood which may have served as a kind of plough-share, to bear the brunt of the wear and tear during ploughing. Iron plough-shares seem to be unknown in the Danish pre-Roman Iron Age, and a piece of wood like this could be much more easily replaced, when worn out, than the share-beam itself.

More surprising are the results of the recent pollen-analysis of a fragment of a mould-board plough found some years ago at Tømmerby in Denmark.[21] This v-shaped fragment, cut from a forked beech-branch, formed part of the share-beam of a form of heavy plough with mould-board and, almost certainly, wheels, which survived in Denmark down to the beginning of last century (see FIG.). The left side is protected by the insertion of a number of pebbles into holes drilled for the

[21] *Aarbøger for nordisk Oldkyndighed*, 1936, 130–144; French summary, xviii–xix.

purpose ; these take the brunt of the wear during ploughing, and their absence on the right side indicates the former existence of a mould-board. The deep scarfing of the joint for the attachment to the beam indicates that the latter must have been so thick that wheels would be required to bear its weight. At the point of the share-beam is a hole for the insertion of a tanged share, probably of wood, and no doubt similar to a specimen found at Borris in Jutland (PLATE I). Three specimens of peat found in crevices on both sides of the surviving fragment of this plough all yielded on pollen-analysis the consistent conclusion that the implement found its way into the bog at the beginning of the pre-Roman Iron Age—a considerably earlier date than any hitherto known evidence regarding this type of plough.

On due reflection this conclusion need not surprise us, for it tends to confirm the suspicion, that we in Britain have for some time entertained, that the heavy plough may have been invented and developed in Teutonic or perhaps Scandinavian districts, for we have reason to believe that it was first introduced into Britain by the semi-Teutonic Belgae in the 1st century B.C., and that its use was made general by the Teutonic invaders of the 5th century A.D.[22] It would therefore be natural to look for its first development in Teutonic areas some time before the 1st century B.C., so that the appearance of the Tømmerby plough in Denmark some three centuries earlier is no more than we need expect.

Professor Hatt correlates the appearance of a heavy plough at that time with the onset of wetter climatic conditions, for he points out that the *ard* is suited only to light, dry soils, while the mould-board plough is specially suited for breaking up heavy, wet soils and thick turf.

Steensberg discusses the forms of ploughshares and coulters that have been found, and describes an undated oak share from Borris in Jutland, two feet long, consisting of a conical head about 6 in. long and 3 in. wide, with a tang of rectangular section a little more than an inch across (PLATE I). The marks of wear show that a mould-board was used. He also discusses early historical references to ploughs, but as the passages quoted from Anglo-Saxon and Old Norse books are not translated they are incomprehensible to the ordinary reader. Finally a considerable number of medieval illustrations of ploughing scenes in England, Denmark, northern France and Germany, are reproduced and described—a very valuable collection. It is remarkable that out of

[22] *Antiq. Journ.*, 1933, XIII, 455–463.

nine implements depicted as possessing wheels, a coulter and a massive ploughshare, only one shows a mould-board in use, whereas of four ploughs showing a mould-board and coulter, only one has wheels. Moreover, the wheeled ploughs are depicted as drawn by two oxen in three instances, by four oxen in one case, and by a team of two oxen and two horses in another. (The use of horses for ploughing begins to appear in Denmark in the 15th century). Never is a larger plough-team than four beasts shown. We have always considered that the English open-field system with its long, narrow acres was based on the use of a heavy plough possessing wheels, coulter, broad ploughshare, mould-board, and a team of eight oxen, the whole complex having been brought into general use by the Angles and Saxons. There seems very little doubt that this picture of the early English plough is correct in theory, for the division of the hide into eight bovates is alone enough to show that for purposes of assessment and communal ploughing the plough was supposed to be drawn by eight oxen.[23] But whether the theory was always put into practice is entirely a different matter, and the illustrations collected by Steensberg strongly suggest that it was not. The absence of a mould-board on an otherwise typical heavy plough does not seem to the present writer to justify the term ' wheel-*ard* ', as Steensberg calls them. One such ' wheel-*ard* ', without coulter or mould-board—a Swedish specimen dating from about 1800—is preserved at Copenhagen, and does, perhaps, deserve this name, as it is clearly a hybrid between a plough and an ard, the latter implement still being seen occasionally in use in parts of Scandinavia.

Wooden spades and shovels have also been found in Danish bogs, dating from the Migration Period, about the 5th century A.D., and in particular several large wooden rakes, of which the best preserved has a shaft nearly 7 ft. long, and a crosspiece 2 ft. 3 in. long, in which are set twelve wooden teeth, each about 10 in. in length.

The next most important agricultural implement after the plough is the sickle. The Danish crescentic flint blades are too well known to need much description, but it may be emphasized here that they differ from the British curved sickles in that the former taper to a point at each end, while the latter have a blunt butt or tang at one end. These differences clearly reflect different methods of hafting, and Oldeberg has suggested that the Scandinavian blades must have been hafted in a groove in a curved wooden mount, like the composite flint sickles of

[23] F. Seebohm, *The English Village Community* (1915), 60–6.

Mediterranean lands.[24] Actual wooden mounts belonging to this type do not seem to have survived.

The method of mounting the British type is made equally clear by the discovery of a flint sickle, complete with its wooden handle, at Stenild in Jutland[25] (PLATE II). The flint in this case is admittedly an almost unworked flake, not a carefully worked blade like the British specimens, but the method of mounting must have been the same. The blade, which is $4\frac{1}{4}$ in. long and has its exposed parts covered with brilliant corn-gloss,[26] is set in a socket at right angles to the distal end of the wooden haft, and is given extra rigidity by a projection of the latter which supports the back of the blade for $1\frac{1}{4}$ inches. The wooden handle is 14.2 in. long, and the available cutting edge of the blade as mounted is about 3 inches long. A set of ten similar sickle-blades (PLATE II), all blunted by use and showing the characteristic corn-gloss, with lengths varying from $4\frac{3}{4}$ to 6 in., was found together at Freltofte in Funen and should stimulate us to look out for similar sickle-blades in Britain ; the type is, in fact, beginning to be recognized here.

There is some division of opinion as to whether the crescentic flint blades were actually used as sickles or as ' leaf-knives ', *i.e.* bill-hooks or slashers for cutting leaves and twigs of deciduous trees for winter fodder for cattle—an old method of foddering cattle in Scandinavia, and in Italy, according to Cato. Such a usage should produce diffuse gloss on the blades, like that from corn-straw. The National Museum at Copenhagen possesses over a thousand of these crescentic blades, which are seldom found in graves, but usually in dwelling-sites or in hoards which are sometimes regarded as possibly having been deposited as offerings to the gods.

Similarly the bronze sickles—which bear a very close resemblance to those of the Alpine lake-dwellings—are much commoner than in Britain ; the National Museum has over a hundred specimens as contrasted with the 25 flat, and 14 socketed, bronze sickles known from the whole of Britain.

In the Iron Age we begin to find differentiation of form between sickles and scythes. One hoard from Vimose, dating from the Migration Period, consisted of three iron sickles and a scythe-blade, one of the

---

[24] *Acta Archaeologica*, 1932, III, 209–30.

[25] Original description by Chr. Blinkenberg in *Aarbøger for nord. Oldk.*, 1898, 141–56.

[26] See ANTIQUITY, 1930, IV, 184–6 ; 1935, IX, 64–5.

sickles retaining its original wooden handle, 9 in. long. The scythe-blade, which is 12 in. long, has the peculiar tang, terminating in a spike bent at right angles, which survives on the small modern Norwegian scythes. The significance of the scythe lies in its testimony to a more advanced system of cattle-raising, and it was specifically designed for cutting hay close to the ground, whereas the sickle was used for cutting off the ears of corn at waist-level.[27]

Ancient Cultivations

Remains of ancient derelict cultivations are abundant in Denmark, and are of more than one kind. Professor Hatt's work in this connexion has already been reviewed in some detail in ANTIQUITY,[28] so that it will not be necessary to say very much about them now.

The most important type is that which corresponds in form and general arrangement to our Celtic field-system. In this we find large numbers of small, squarish plots, separated by field-banks of turf or stones, or by low lynchets, and generally from $\frac{1}{4}$ to $\frac{3}{4}$ acre in area. This field-system seems to be peculiar to the pre-Roman Iron Age. One of the best examples of this type is to be found on the eastern slope of a small valley on Byrsted Hede[29] (PLATE III), while opposite to it, on the western slope, is a separate series, consisting partly of similar squarish plots, but mainly of long, narrow strips of variable length, running up and down the hill-side, and separated by similar field-banks. The lengths of these strips varies from about 170 ft. up to 1100 ft., and the breadth is usually about 50 to 60 ft. In some cases there is evidence of a plot being subdivided, presumably between heirs, and this observation, together with the lack of uniformity in the size of the plots, makes it fairly certain that we are not dealing with a form of open-field system. It has not been possible to date this western series of fields on Byrsted Hede, but Professor Hatt is tempted to associate these primitive strip-cultivations with the early use of the heavy, mould-board plough like that from Tømmerby, and to assign them provisionally to a phase of development anterior to the rise of the open-field system, which as we know it in medieval England, was based on the use of the eight-ox plough and the standard acre-strip of 660 ft. by 66 ft.

---

[27] Discussed in a review in ANTIQUITY, 1934, VIII, 237–9.

[28] ANTIQUITY, 1932, VI, 393–8.

[29] 'Hede', that enters into so many of these place-names, corresponds to our 'Heath'.

A section through a lynchet at Byrsted Hede showed that the heath conditions which obtain now in that area did not exist when those fields were brought under cultivation, and Knud Jessen has been able to show that in general the farmers of the pre-Roman Iron Age chose areas that were then on the zone of overlap between heath and forest.

Among the fields of pre-Roman Iron Age date on Fogstrup Hede evidence of local iron-working was found in the form of smelting-hearths. Such a hearth would be found in the corner of a field under the shelter of a lynchet, accompanied by bog-iron ore, cinder, hammerstones and quartzite anvils, and this industry was proved to be contemporary with the cultivation. Strikingly enough, a small valley which runs through the area in question is called Smeddal, that is ' smith-dale '.

At Grøntoft Hede evidence was found suggesting that the fields there had originally been marked out with a small ditch or furrow.

There appears to be no evidence as to when the high-ridged strip-cultivations first appeared ; they are a product of the mould-board plough, but the latter had certainly been in use in Denmark long before the ridged acres appeared. They are also a product of the medieval common-field system, but it is not known when and how this first arose. The plots of the pre-Roman Iron Age must be regarded as having belonged to individual owners, and not as part of a common-field system.

Houses and Villages

Neolithic houses have been found at Troldebjerg by J. Winther, and are of two forms : horseshoe-shaped, and rectangular. The latter lie in a row, north to south, each having a single row of roof-bearing posts placed between the middle line of the house and the west wall. The latter, which is of wattle and daub, is the only vertical wall, the roof sloping obliquely down to the ground on the east side.

Houses and villages of the Roman Iron Age are much commoner. A fine example at the farm of Mariesminde has been fully described by Professor Hatt in Antiquity,[30] so that little need be said here on this subject except to draw attention to the long type of house, consisting of the living-room with its central hearth at one end, and the byre at the other end. This type of dwelling, translated into dry stone masonry, survives to the present day in use in the Hebrides[31] where it may well

[30] Antiquity, 1937, xi, 162–73.

[31] See forthcoming article in Antiquity.

have been introduced by the Vikings. Typical long houses were supported on two rows of posts placed about 2 to 3 ft. on the inner side of the earthen walls. The latter were about 5 ft. thick, and the internal dimensions of the house might be as much as 47 by 17 ft.

Of household implements the most important is the quern or hand-mill. The saddle-quern—or ' push-quern ', as the Danes call it (*Skubbekværn*), for it by no means always resembles a saddle—is very common on all the earlier Iron Age occupation-sites, and goes back to the Neolithic period. It was used for grinding corn, not only in and between the houses, but also on the edges of the fields themselves. The rotary quern, which superseded the saddle-quern, does not appear in Denmark till the 3rd century A.D.—some 400 years after it reached southern Britain. Nothing is said of its typology, but the only specimen illustrated is of the thick, narrow variety, with almost flat grinding-surfaces, similar to our north British type, except that no handle-hole is present.[32] This lack is by no means uncommon, and it is surely not necessary to suppose, with Professor Hatt, that the upper stone was swung round, first one way and then the other, by means of both hands without a handle. This seems highly improbable ; more likely is it that it was turned by means of a radially placed wooden handle that was jammed into the central aperture. This was definitely the method adopted in the later Roman querns of southeast Britain.

In the Roman Iron Age corn was stored in great jars within the house. The one illustrated (PLATE IV), from Ginderup, stands 4 ft. high, and has an opening near the bottom from which the housewife could take small quantities of corn as required. In this case the jar contained oats.

The labour of grinding corn was diminished if the grain had previously been roasted or ' parched '. The coarse-ground barley found in a jar in a burnt house-site at Grønvang on the island of Mors was passed through sieves of different meshes, in order to study its character. Of the contents of the jar, 37 per cent. passed through a mesh of 1 mm., then 45 per cent. through a mesh of 1.5 mm., after which 13 per cent., consisting of broken pieces and whole grains, passed through a mesh of 2 mm., leaving 5 per cent. (mainly whole grains) in the sieve. The larger broken pieces appeared as sharp, angular fragments, indicating that they had undergone roasting before being ground. Experiments at grinding barley in an old quern showed that when not previously

[32] ANTIQUITY, 1937, XI, 147.

roasted the grains tended to be rolled out into flattened forms, but when dried in an oven the tuber was less flattening no angular fragments. If, however, the barley was first roasted it easily broke into angular fragments on grinding, similar to those found in the jar at Grønvang. The corn should be dried first, and then roasted slowly, otherwise it blisters. This roasting gives the meal a slightly sweet taste, as part of the starch is thereby converted into dextrin.

The barley meal is as likely to have been used for porridge as for bread, and we know that it was actually used for making beer. A black mass in the bottom of a bronze vessel from a woman's grave of the Roman Iron Age at Juellinge on Lolland turned out to be the remains of a kind of beer brewed from barley and flavoured with cranberry or cowberry, and bog-myrtle. A similar result was obtained in the case of a Bronze Age woman who was buried at Egtved with a birch-bark bucket containing the remains of mead brewed from wheat and honey. Tacitus mentions the use of barley and wheat for this purpose among the Germans.

The Iron Age settlement of the land comprised both compact villages and scattered farms. At Østerbølle is to be seen an excellent example of a long-village, consisting of two parallel rows of dwellings, the plan of which might be that of a present-day village in the Hebrides. As in Britain, so in Denmark, the habitation-sites of the Bronze Age are almost unknown, so that it looks as if the people of that time tried by the magnificence of their graves to make up for the lack of houses for the living. When they are found, the occupation-layers of the Neolithic and Bronze Ages are very thin as compared with those of the Iron Age, which suggests that the Neolithic and Bronze Age folk were probably semi-nomadic, living long enough on one site to reap a crop, or two crops, and passing on to fresh pastures and to break up fresh ground. For similar reasons, and for other reasons too, the same conclusion probably applies to Britain as well.[33] In the Iron Age, on the other hand, villages and farms were more or less permanent settlements, and the fields were tilled long enough to leave visible traces today. This change may have been due partly to the use of new types of implement, such, perhaps, as the *ard* and the plough, and partly to the working of iron which gave the peasants access to a metal that was not only native, but which was much more easily worked than bronze. Permanent settlement implies the use of manure for the fields, and this became

[33] *Proc. Prehist. Soc.*, 1938.

PLATE I

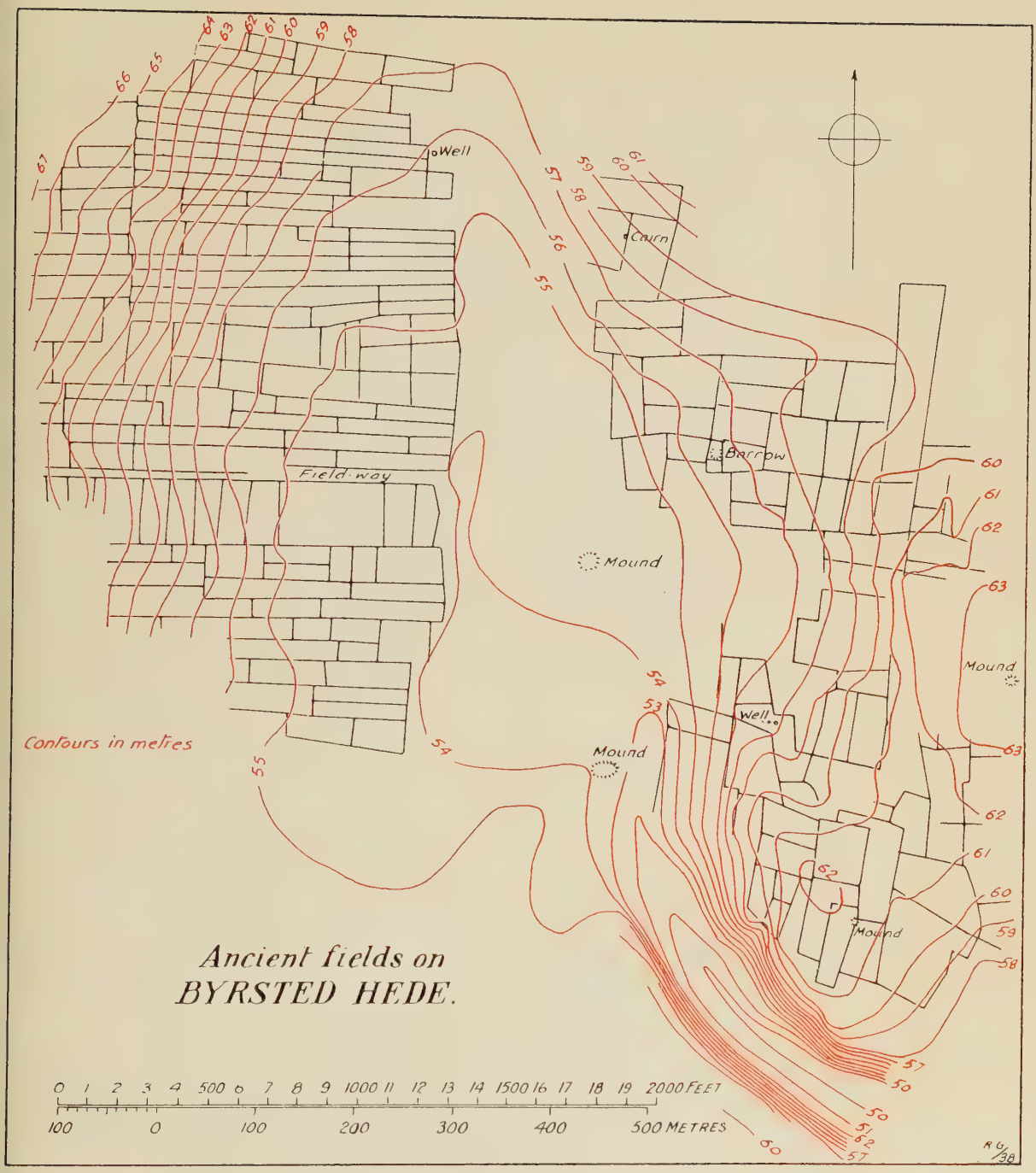
WOODEN *ARD* FROM DØSTRUP, JUTLAND (about $\frac{1}{20}$)
Length of beam, 10 ft. Dated by pollen-analysis to the beginning of the pre-Roman Iron Age (*see* p. 145)
(*National Museum, Copenhagen*)

WOODEN PLOUGH-SHARE WITH TANG (about $\frac{1}{4}$). Length 2 ft. (*see* p. 146)
(*National Museum, Copenhagen*)

facing p. 152

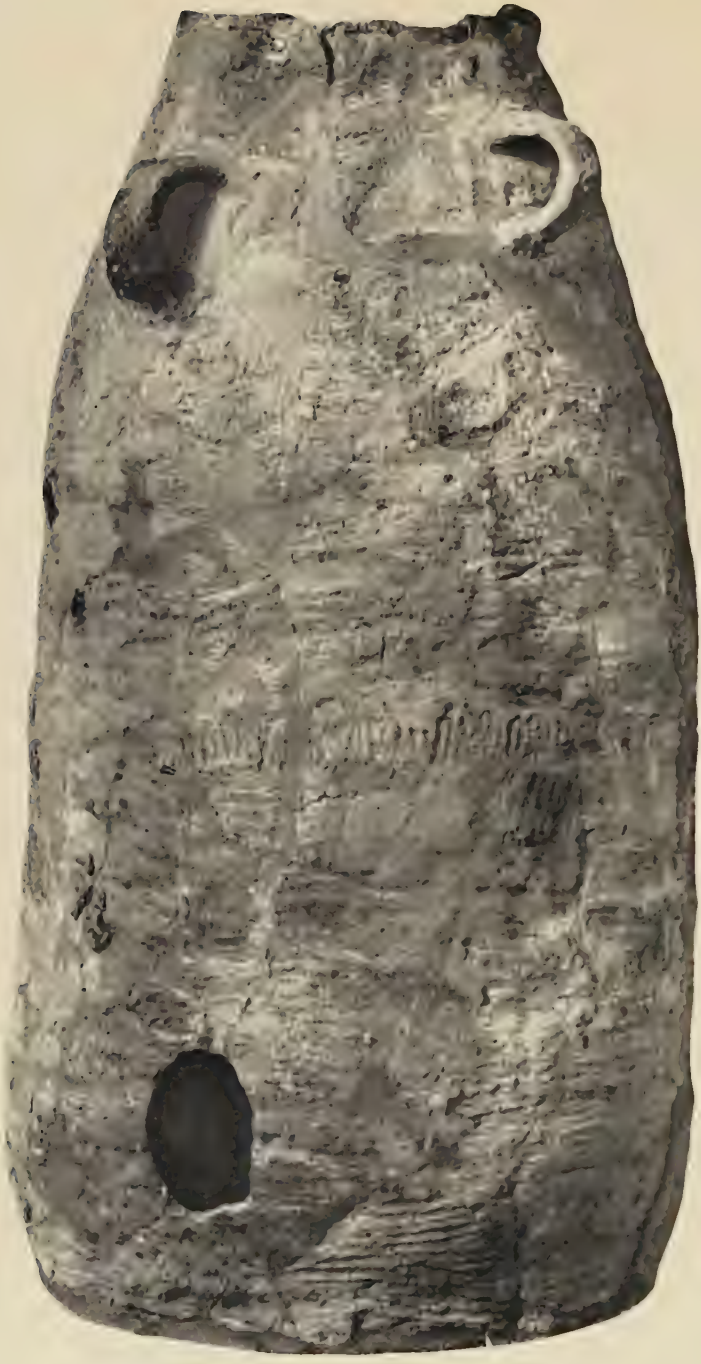
Left: FLINT SICKLE IN ORIGINAL WOODEN HANDLE; STENILD, JUTLAND ($\frac{1}{3}$)
Right: SET OF TEN WORN-OUT FLINT SICKLE-BLADES FOUND TOGETHER AT FRELTOFTE, FUNEN ($\frac{1}{3}$)
All the flints show corn-gloss. (*See* p. 148)
(*National Museum, Copenhagen*)

PLATE III



ANCIENT CULTIVATIONS ON BYRSTED HEDE (*see* p. 149)
(*After* Hatt)

PLATE IV



STORAGE JAR CONTAINING OATS, GINDERUP ($\frac{1}{7}$)
Roman Iron Age. Height 4 ft. (*see* p. 151)
(*National Museum, Copenhagen*)

available as a result of the stalling of cattle in byres ; winter-feeding was also ensured by cutting hay with scythes. It is possible that the deterioration of the climate in the Iron Age necessitated this form of care for the cattle, for without it the latter could not survive a snow-bound winter. It would seem that the semi-nomadic existence would only be possible in a climate with mild winters, such as may have been the case during the Neolithic and Bronze Age.

* * *

The last chapter of Professor Hatt's fascinating study deals with Religion and Society, and shows how the universal fertility cults, and also the structure of society, have been built up on the basis of the needs of the agricultural community. Of this, however, stimulating as it is, there is no space to deal here. It is only when we have similar studies of early agriculture in the other countries of Europe, equally free from racial or political bias, sane and well-considered, that we shall be able to complete the picture of that food-production which has been the mainspring of all the activities of primitive man since corn and cattle first appeared.

The Reindeer Hunting Tribes of Northern Europe

by J. G. D. Clark

THERE is some truth in the assertion that the greatness of Britain, as displayed to the world at the Great Exhibition of 1851, should be ascribed as much to the favourable juxtaposition of iron and coal as to any qualities inherent in the British people : it can hardly be disputed that the pre-eminence in Prehistoric Archaeology once enjoyed by France was due in large measure to the archaeological richness of the caves and rock-shelters of the Dordogne and the Pyrenees. But, if we must deplore the backwardness of France in fields where other countries are as richly endowed by history, it is only fair to acknowledge that her archaeologists succeeded in systematizing the cultures of Upper Palaeolithic man in western Europe, at a time when the Neolithic was still chaotic in many countries and a ' hiatus ' separated the two epochs. The exploration of the French caves began in the sixties of the last century and may be said to have already reached its culminating point by 1912, when Breuil put forward his famous classification at the Geneva Congress (Breuil, 1912). It is eloquent of the advanced stage reached by Upper Palaeolithic cave research in western Europe before the Great War that, after the lapse of a quarter of a century, Breuil has felt able (in 1937) to re-print his original lecture with only minor alterations.

Parallel with the work of cave exploration in France and neighbouring areas went the investigation of the settlements and tombs of neolithic man, in which the archaeologists of north and of central Europe played the leading role. If the systematization of the neolithic cultures has, despite certain regional exceptions, proceeded less rapidly than that of the Upper Palaeolithic, this is due both to the greater complexity inherent in the study of richer and more variegated cultures and to the existence of blank areas of which France and (until recent years) the British Isles were conspicuous examples.

As knowledge of the palaeolithic and neolithic cultures of Europe began to assume definite shape it became evident that a gap existed in

knowledge for the period between the extinction of the older and the appearance of the newer civilization, and this blank period was seen to increase in length as chronology became more precise. While at one end the Upper Palaeolithic ' cave ' cultures have come to be assigned, on the evidence of geological correlations, to a remote period of time, at the other the establishment of accurate synchronisms with the early civilizations of the eastern Mediterranean, Egypt and the Near East has led in recent years to a progressive contraction in the dating of the Neolithic cultures of central and of northwestern Europe. It was at first supposed that this blank constituted a veritable ' hiatus ' in the human settlement of Europe, a period of desolation following on the disappearance of the Upper Palaeolithic reindeer hunters and only ended by the arrival of new ethnic groups equipped with a neolithic civilization. But the work of the last forty years has shown that, far from being depopulated during this lengthy period of time, Europe was inhabited by several distinct groups of hunting, fishing and food-gathering tribes, for whom the comprehensive term ' Mesolithic ' was soon devised. Piette's excavations at Mas d'Azil (1895), de Mortillet's recognition of the Tardenoisian (1896) and Sarauw's excavations at Mullerup (1900) mark important first-steps towards the modern conception of the Mesolithic, a conception which goes far to establish continuity between the Palaeolithic tribes of the remote past—shadowy inhabitants of geological time—and the Neolithic and Bronze Age communities with which it is not difficult for Europeans of the twentieth century to feel some degree of kinship. Yet, prior to the remarkable work of Prof. G. Schwantes and his brilliant pupil, Alfred Rust, in the Hamburg-Kiel area to which it is the purpose of this article to draw attention, the gap remained incompletely bridged. Much, indeed, was known of the forest cultures of the Boreal and Atlantic periods, but the long pre-Boreal remained almost completely blank in the prehistory of northern Europe. Less than a score of axes and adzes formed of reindeer antler, termed ' Lyngby ' axes after the finding-place of one of them at the northern tip of Jutland, and a few stray flints comprised the sum total of the archaeological material available for the vital period which saw the transition from tundra to forest conditions.

The story of how the recent great advance in knowledge has come about is worth recalling in some detail. The first step was taken when Schwantes recognized the significance of a flint industry found on surface sites at Ahrensburg, a small town to the northeast of Hamburg (Schwantes 1928 and 1931). The flint types (FIG. 1, nos. 1–8)

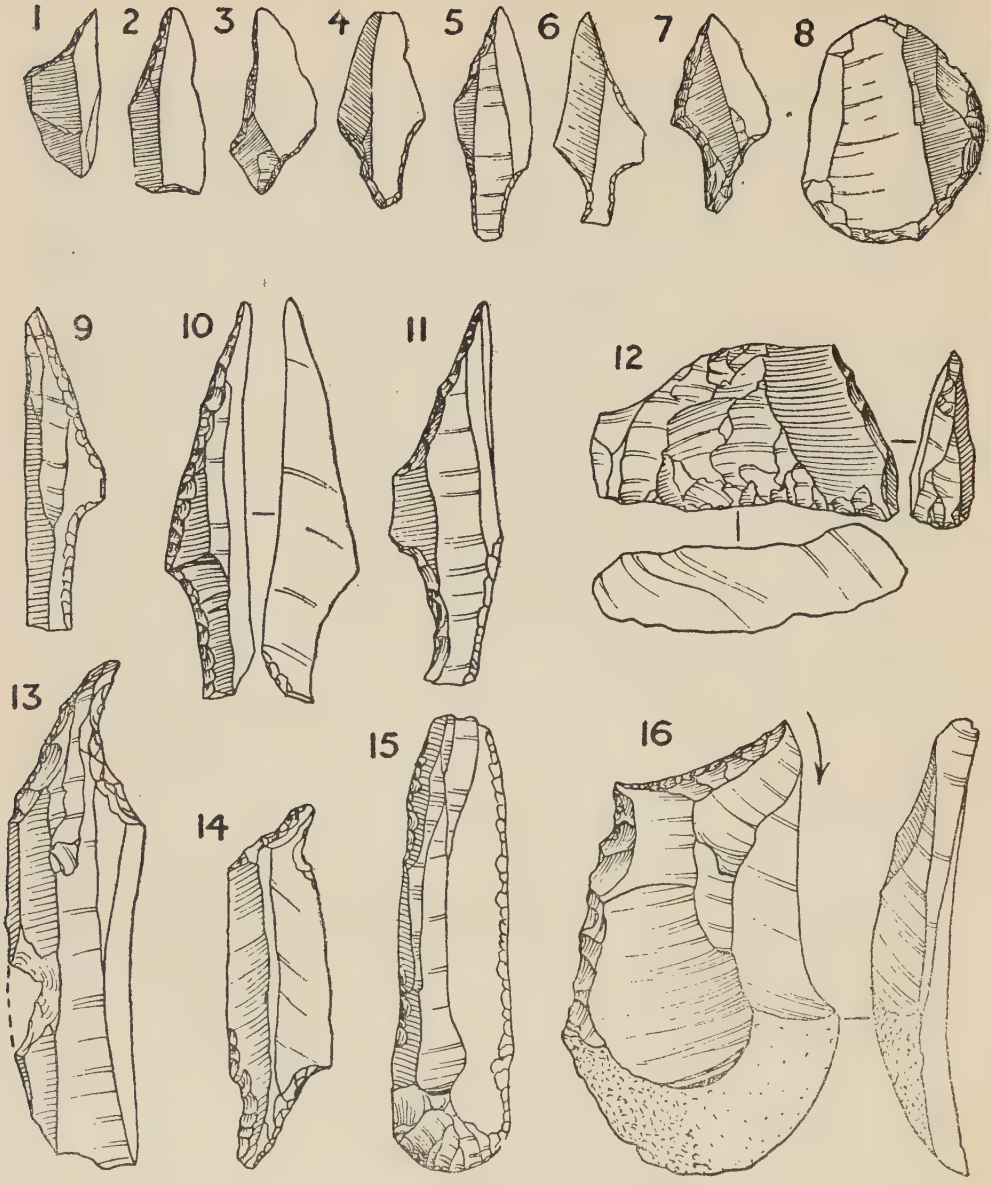


FIG. 1. LEADING FLINT TYPES
nos. 1–8, Ahrensburg culture; nos. 9–16, Hamburg culture. Scale $\frac{1}{1}$

included burins, keeled, horseshoe and end-of-blade scrapers, primitive forms of microlith and, as the type fossil, delicate tanged points, recalling those of the Polish Swiderian, but lacking the inverse retouch. The Ahrensburg industry was assigned by Schwantes to the pre-Boreal on purely typological grounds, but stratigraphical support was forthcoming almost immediately when Dr J. Andree of Münster excavated an identical flint industry from the Hohle Stein, near Callenhardt, Westphalia (Andree, 1932). In this cave the Ahrensburg industry was found to be associated with a transitional fauna including both tundra (reindeer, white grouse, arctic hare and arctic fox) and forest (red deer, roe deer, elk, wild pig, beaver, wood marten, etc.) species. The excavation also yielded a few artifacts made from organic materials—some pointed bones, a perforated reindeer phalange (a whistle ?), a bone handle and perforated teeth.

A second significant discovery was the recognition in 1932 of a number of surface flint-sites in the Hamburg area, particularly along the course of the Alster in the neighbourhood of the village of Wellingsbüttel, the industry from which was distinctly Upper Palaeolithic in appearance. A leading feature was the excellence in blade production, the chief types (FIG. 1, nos. 9–16) consisting of keeled and end-of-blade scrapers, burins, shouldered points and so-called pronged instruments (*zinken*) or awls worked at one or both ends of blades. Specimens of the leading types were submitted to experts at the London Congress of 1932, and their Upper Palaeolithic character was generally accepted. Although the only evidence available at that time was typological, Schwantes did not hesitate to claim the existence in north Germany of a culture—the Hamburg culture—of true Upper Palaeolithic type, comparable, although distinct from, certain stages of the cave Magdalenian of France (Schwantes, 1932).

By 1932, then, it had been established that in north Germany there existed at the period of transition from tundra to forest conditions a distinctive lithic industry, the Ahrensburg industry, approximately contemporary with the well-known Lyngby axes, while there were definite indications of an even earlier stratum of population in the same area, represented by the Hamburg flint sites. Clearly one could get no further without excavation. It was necessary to date the two industries and to recover as much as possible of the components of the cultures as were made from organic materials.

As a glance at the maps (FIGS. 2 and 3) will show, the Hamburg-Kiel area straddles the margins of the Weichsel ice-sheet, both at its

maximum extension (=Würm II of the Alps) and at the period of the Pomeranian stadium (=Würm III or Bühl). Such an area might be expected to favour correlations between Late Glacial and pre-Boreal cultures, and deposits dating back to the period immediately following the retreat of the ice and its final withdrawal to the Scandinavian peninsula. From these deposits one might hope to obtain a close

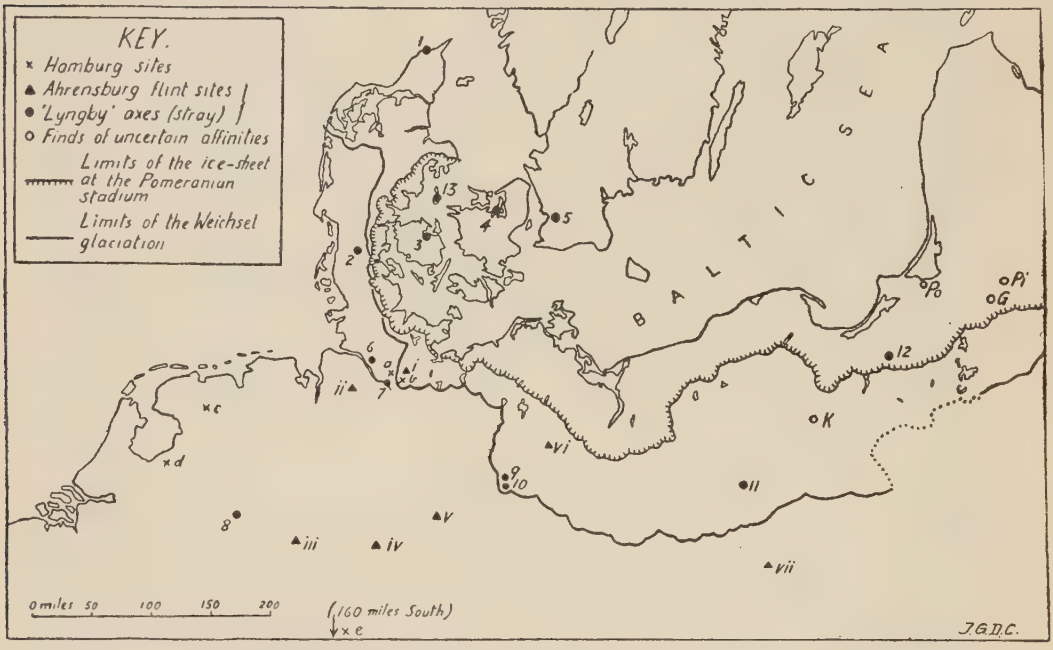


FIG. 2. MAP SHOWING THE DISTRIBUTION OF SITES OF THE REINDEER-HUNTING PEOPLES OF NORTHERN EUROPE OF LATE GLACIAL AND PRE-BOREAL AGE

nos. 1–13, Lyngby, Fovrup, Odense, Vejleby, Bara Lilla Mosse, Fahre Rusterbergen, Langenfelde, Haltern, Pritzerber, Briest, Murovana (all, Clark, 1936), Mitteldorf (Gross, 1937a), and Samsö I. (Nordman, 1936, 207); nos. i–vii, Ahrensburg (Stellmoor), Lavenstedt, Hohle Stein, Ellierode, Rieseberg, Borgsdorf, and Brustawe (all, Clark, 1936); nos. a–e, Wellingsbüttel, Meiendorf, Oosterwalde, Elspeet, and Schussenquelle; Po, Popelken (Clark, 1936); G, Gumbinnen (Gross, 1937b); Pi, Pillkallen (Gross, 1937c); K, Kulm (Gross, 1637).

N.B. For the many recently recognized Hamburgian Sites in Hannover and Oldenburg, see p. 163, footnote.

stratigraphical dating for each of the cultures, an accurate idea of the climate and vegetation contemporary with each, and, with good fortune, artifacts of antler, bone and possibly of wood.

In the search for sites which might be expected to provide such a correlation attention was early directed to the *tunneltäler* (valleys formed by streams of melt-water flowing under the melting ice-sheet), since the ponds and lakes that once existed along their courses must have

attracted settlers to their shores, and the sequence of clays, muds and peats that have since filled them up might be expected to yield traces of such settlement in the form of peripheral ' scatter '. Such ponds—and it may be added many of the innumerable lakes still extant within the territory of the last ice-sheet of north Germany from Schleswig-Holstein to east Prussia—are thought by geologists to owe their origin

(*After P. Woldstedt*)

FIG. 3. SHOWING THE LIMITS OF THE WEICHSEL ICE-SHEET IN THE NEIGHBOURHOOD OF HAMBURG AND KIEL

The stippled areas outside the moraine indicate spreads of melt-water sands. The network of black lines within the moraine show the *tunneltäler*, many of which are occupied to-day by fjords or by inland lake systems. M=site of Meiendorf excavation. S=site of Stellmoor excavation.

to the melting of buried ice formed in the cold season in portions of the *tunneltäler* beyond the ice-margin, under the influence of cold winds blowing off the ice-sheet ; such ice might become buried by gravels and sands outwashing in the warm melting season, and in some cases remain intact for centuries before melting and giving rise to water-filled depressions (Gripp, 1935 and 1937).

The site first selected (in 1933) for excavation was situated on the

edge of a well-defined *tunneltal* between Meiendorf and Ahrensburg, a few miles northeast of Hamburg (map, FIG. 3), at a point where borings had indicated the existence of such a silted-up basin in the immediate neighbourhood of a sandy hillock, on which flints typical of the Hamburg culture had previously been found (PLATE I). By employing methods similar to those used in the English Fenland to effect archaeological-geological-palaeobotanical correlations (Clark, Godwin and Clifford, 1935) the excavator of the Meiendorf site, Alfred Rust, succeeded in realizing each of the aims outlined in an earlier paragraph. A full and well-illustrated account of the excavation has just appeared in the monograph *Das altsteinzeitliche rentierjäger-lager Meiendorf* (Karl Wachholtz, Neumünster : s. 146, Taf. 57, fig. 32 : price 16 RM), the work of Rust in co-operation with the Hamburg scientists Karl Gripp (geology), Walter Krause (fauna) and Rudolph Schütrumpf (palaeobotany).

The Meiendorf section (FIG. 4) gave the following sequence :— at the base varved sediments deposited in the melt-waters of a retreating ice-sheet, followed by 1½ metres of calcareous mud (*kalkmudde*), a few centimetres of sand, *c.* 30 cms. of sedge-peat (*seggentorf*) with wood and tree-stumps, somewhat more than a metre of mud (*faulschlamm*), ¾ m. of reed peat (*shilftorf*) and at the top 1¼ m. of brushwood peat (*bruchwaldtorf*) with the stumps of alders. The scatter of archaeological material from the site on a neighbouring hillock was found to rest on the floor of the basin in the bottom of the calcareous mud. Schütrumpf's palaeobotanical researches (1937) have shown that the vegetation contemporary with the base of the calcareous mud, and by consequence with the settlement of the Hamburg people, was of characteristic tundra type. The pollen diagram (FIG. 4) shows, it is true, the presence of birch, pine and willow pollen at this level in the section, but it can easily be proved that this tree pollen must have been blown in from a distance, from regions further south. For one thing it is significant that in the base of the section the pollen of grasses and herbs reached values greatly in excess of those for the forest trees, the frequency in one sample being over five times as great, which argues for open country. But the decisive evidence comes from a macroscopic study of the plant-remains from the same level. This showed that whereas there was no trace of the wood, the leaves or the fruits of the forest trees, the remains of characteristic tundra species—*Dryas octopetala*, *Salix polaris*, *S. reticulata*, *Betula nana* and various leafy mosses—occurred freely. The bone and antler material from the archaeological

FIG. 4. THE MEIENDORF SECTION. (*Based on Schütrumpf*).

level can hardly be taken as giving a complete picture of the fauna contemporary with Hamburg man in the Meiendorf *tunneltal*; but it is significant that the only animal really well represented was the reindeer (71 individuals), which must have been his chief quarry in the hunt and which certainly provided him with a principal raw material for tool-making. Other species represented include horse, hare (sp. ?), badger, fox, glutton, white grouse (6 individuals), a gull and several water-birds —duck (3 sp.), geese (2 sp.), swan, crane and spotted moorhen— reflecting the existence of sheets of open water, and suggesting that the Hamburg people were fowlers as well as hunters.

From a purely archaeological point of view the recovery of a quantity of worked bone and antler, including finished objects and debris from which technical processes can be deduced, is of outstanding importance. The material chiefly favoured for tool-making was reindeer antler, particularly the tough antler of the adult male, which is so finely preserved as to reveal the finest cuts and striae as clearly today as when first made. The method used to obtain the splinters, from which finished objects could be worked, involved two processes : first, two incisions were made at slight intervals on the inner arc of the antler, converging at either end, although parallel for the greater part of their length, up to 90 cm. (PLATE II, 1) and, secondly, the splinter was detached from the parent antler. The tool used for making the preliminary incisions through the hard outer core of the antler was the flint burin, whose abundance (*c.* 18 per cent. of the worked flints) thus receives a reasonable explanation. The method of loosening the splinter defined by the burin incisions varied according to the toughness of the antler : sometimes it was possible to prize it out directly by driving in wedges (the marks of which can be seen on PLATE II, 2), but often it was necessary to undercut the hard outer layer by boring away the underlying canellous tissue, a process almost certainly accomplished by the use of the ' pronged ' implements (*zinken*) (cf. FIG. 1, nos. 13, 14), which made up some 21 per cent. of the worked flints from the site.

Among the objects made from such antler splinters (PLATE III, 1) are a ' harpoon ' with one row of barbs (PLATE III, 2) and a double-pointed object of circular section (no. 3). The former may have been used in hunting the reindeer—it certainly ' fits ' the oval perforations found in several reindeer shoulder-blades from the site, and the latter almost certainly served as an arrow-tip for bird-shooting, tallying well with the wounds to be seen in some of the crane and ptarmigan bones. The use of three pieces of hook-like form (PLATE III, 4, 7) with, at the

lower end of the shank, oblique slots for the insetting of flint flakes (no. 7 was found with the flint in position) is problematical, although Rust believes them to have been used for delicate leather-cutting. Whatever the truth of this, it is certain that leather must have been a valuable by-product of hunting, and it was doubtless in preparing skins that many of the numerous flint scrapers (forming some 25 per cent. of the worked flints) were used.

Bone objects include one-edged knives (flensing knives ?) made from reindeer ribs, and various objects of unknown use made from the wing-bones of geese (PLATE III, 5) and swan.

Finally, one should mention a thin amber plaque (incidentally the earliest known instance of the use of this substance) perforated through the middle, its surface covered by faint scorings, which serve to obscure a faintly incised—and it must be confessed somewhat spiritless—outline of an animal's head and neck (no. 6). In style the engraving reminds one more of the cervids on the well-known Maglemose antler-haft from Ystad, south Sweden (Clark, 1936, fig. 61, no. 6), than of anything from the Upper Palaeolithic cave deposits of central or of western Europe.

In considering the affinities of the Meiendorf people it is essential that full weight be given to the nature of the site. It is known from the faunal evidence (Krause, 1937, 48–9) that Meiendorf was occupied only during the summer months : it is the site of a summer camp of a small group of reindeer hunters, typical in all likelihood of hundreds placed at different times on the shores of lakes and ponds in the *tunneltäler* of north Germany. Thus the Hamburg people can be regarded as the earliest inhabitants of north Germany only in a very limited sense ; in reality they were summer visitors who followed the reindeer northward on their seasonal migrations, but dwelt for the greater part of the year in regions further south. It would be premature to define the geographical range of the culture, but its flint components have been found on surface-sites as far west as Elspeet and Oosterwalde in Holland (Popping, 1931 and 1932),[1] reindeer antlers showing traces of the Meiendorf 'splinter' technique are recorded from Late Glacial deposits at Popelken and Kulm in east Prussia (Gaerte, 1926 and Gross, 1937c), and the reindeer hunter's camp of Schussenquelle in Swabia with its antler 'splinter' technique (Schmidt, 1912, taf. XXIV, 8 a and b), its flint *zinken* and its harpoon barbed on one edge extends the distribution to

[1] Many surface sites have now been recognized in Hannover and Oldenburg, from Meppen in the west to Gifhorn in the east, and Stade and Cuxhaven in the north. A site has also turned up in the neighbourhood of Rendsburg (Schwabedissen, 1937).

south Germany. The Schussenquelle site yielded remains of 400–500 reindeer, as well as arctic fox, glutton, and a small ox (musk ox ?). The archaeological level overlay a late glacial moraine and was associated with a moss, often referred to as ' Arctic ', but in reality of little diagnostic value ; however, from the absence of tree pollen Karl Bertsch felt safe in deducing that the contemporary vegetation was in fact of tundra type (Bertsch, 1929, pp. 6–7). No exact analogy can be drawn between the Meiendorf material and that from any of the numerous caves of south Germany. Comparisons between the Meiendorf summer camp material and that derived from caves and rock-shelter ' homes ' may to some extent be vitiated by the different status of the sites. Nevertheless it remains significant that neither the antler, bone nor flint-work can be matched at all closely from any of the German ' Magdalenian ' cave stations published by Schmidt (1912) and later writers. It is for this reason difficult to accept Herr Rust's attribution (1937, 135–6) of the Hamburg culture to the Magdalenian. The Hamburgian is best regarded as a self-standing culture the precise origin of which remains at present uncertain. The Meiendorf harpoon with its reversed barb near the base, though it points forward to Mesolithic forms (Clark, 1936, fig. 41, nos. 9 and 12a) differs from anything found in the Magdalenian. The shouldered points, on the other hand, are at home in the Gravettian cultures of Central Europe (*e.g.*, Willendorf) and of south Russia (*e.g.*, Gagarino) (Zamiatnine, 1934, figs. 17 and 18), although neither region can show parallels for the antler and bone work.[2]

Having established the geological and palaeobotanical context of the Hamburg culture and having recovered some at least of its organic components, Rust determined to do the same for Schwantes' Ahrensburg culture. The site selected was near the Hof Stellmoor in the same *tunneltal* as Meiendorf, but a few miles nearer Ahrensburg, at a point where a hillock strewn with Ahrensburg flints overhung a basin filled with Late Glacial and Postglacial muds and peats.

The Stellmoor excavation, on which only preliminary notes have yet been published (Rust, 1936a and b ; Schütrumpf, 1935), proved a truly brilliant success : not only was a well-defined Ahrensburg level located and many of the perishable parts of the culture recovered, but its stratigraphical relationship to the Hamburg culture was definitely

[2] I am indebted to Miss D. A. E. Garrod for her opinion on the Upper Palaeolithic affinities of the Hamburgian.

fixed by the discovery of the Upper Palaeolithic level some three metres deeper.

The Meiendorf and Stellmoor sections agree closely both as to gross stratigraphy and as to the development of vegetation, revealed by pollen-analysis and by the macroscopic study of plant remains. It is thus possible to indicate accurately the position of the Ahrensburg culture in the key Meiendorf section illustrated by FIG. 4. From this section it will be seen that deposits dating from the pre-Boreal and separating the pine-dominated Boreal from the Late Glacial tundra period are especially well developed. Now these deposits are of the liveliest interest, because it is from such that one might hope to obtain material to bridge the gap between the Hamburg Upper Palaeolithic and the Maglemose Forest Culture (represented locally by the site of Duvensee—see the section), and, in fact, it is to the latter half of this pre-Boreal period that the Ahrensburg culture has been found to belong.

According to Schütrumpf the forest history of the pre-Boreal falls into two main phases—a period of birch-dominated forests following the tundra, and a period of birch-pine forests initiated by a strong, and only partly maintained, advance of the pine. The existence of this marked rise in pine values in the middle of the pre-Boreal—a rise more definitely marked in the Stellmoor diagram (Schütrumpf, 1935, abb. 1) and in both sections coincident with a layer of sedge-peat—has suggested to Schütrumpf the existence of a climatic oscillation. The fact of such an oscillation was first proved by the discovery in a brick-field at Allerød, in northeast Zealand, of a peat-mud layer containing the remains of big-leaved birches, and separating two clay layers producing such species as *Dryas octopetala*, *Salix polaris* and *Betula nana*, and it has since been proved at over thirty sites in the area from Holstein and Jutland to Scania and Bornholm (Nordmann, 1936, 207). Schütrumpf regards it as likely, although not fully proved, that the sedge-peat layer in the Ahrensburg *tunneltal* correlates with the warm Allerød oscillation. Further east, in east Prussia, Gross has found traces of a similar oscillation, which he does not hesitate to synchronize with the Danish Allerød (Gross, 1937c). In his sections he found traces not only of a marked advance of the pine, but also of a subsequent tendency to a return of tundra vegetation, reflected in a temporary increase in the quantity of non-tree pollen. The only archaeological find at present referable to the Allerød period, which Gross dates to 10,000–8,500 B.C. (Gross, 1937c), is a point made from elk bone, some 30 cms. long, of oval to circular section and provided with a double-bevelled base for

hafting, obtained from a peat-mud layer between two sub-arctic clay-beds near Gumbinnen, east Prussia (Gross, 1937b).

The Ahrensburg level revealed by the Stellmoor excavations occurred in the lower part of the mud (*faulschlamm*) deposit overlying the sedge-peat, tentatively assigned to the period of the Allerød oscillation. The pollen diagram shows at the Ahrensburg level high values for birch and pine with willows playing a modest role. Although fairly high values are attained by non-tree pollen, the existence of wood fragments shows that the tree pollen, in part at least, reflects the composition of forests actually growing in the *tunneltal* at this time. As at Meiendorf the animal remains, obtained at Stellmoor in great profusion, reflect above all the waste material from animals killed for food. The reindeer is once more by far the commonest species, being represented by over 1300 antlers and ' innumerable ' bones. Other species include elk (one shoulder blade), horse, wolf, fox, lynx, hare, lemming, marten, beaver, swan, goose, crow, duck and ptarmigan. The assemblage as a whole should be compared with that from Hohle Stein, Westphalia (mentioned in an earlier paragraph), of which the leading features were the dominance of the reindeer and associated species and the presence, in smaller proportions, of a certain number of forest types.

The cultural material obtained in the excavations included over 1000 worked flints with all the leading Ahrensburg forms, known previously from Hohle Stein and from the numerous surface-sites of north Germany, as well as many objects made from bone and antler, and, lastly, some very precious wooden pieces. Technically the antler-work betrays a complete break from the preceding Hamburg culture, the splinter technique being entirely absent. The forms are also distinct. Harpoons occur, but they differ in shape from the Meiendorf specimen. The first of those illustrated (PLATE IV, 1–3) has long been familiar by stray finds from the Havel lakes and clay deposits of Brandenburg, published by Stimming (1925, abb. 84–93) and often wrongly ascribed (*e.g.* Clark, 1936, 117) to the Maglemose culture. But by far the most significant antler objects from Stellmoor are the 25 reindeer antler-axes and adzes of pure ' Lyngby ' type—nearly twice as many as were hitherto known from stray finds over all the plain of northern Europe. At one stroke the famous ' Lyngby ' axes, which, culturally disembodied, nevertheless represented almost the sole trace of man for the whole pre-Boreal period in the north, are proved to be part of the equipment of the same people who made these tanged flake flint industries, which gave Schwantes his first clue and led directly to

the Stellmoor excavations. A feature to be noted on one of the Stellmoor axes is the series of cuts, some of them grouped in fours and fives, placed in a line on the upper surface of the handle (PLATE IV, 4a). The wooden objects are also of outstanding interest. The commonest are pine-wood arrow-shafts, ranging from $\frac{1}{2}$ to 1 cm. in diameter and reaching 73 cms. in length, of which over a hundred broken and complete specimens were found. They occur in two main classes, one intended to be inset with a flint point, the other complete in itself. Some of the variations assumed by the tips of the former group are illustrated by FIG. 5, nos. 1–3. It may be mentioned that specimens

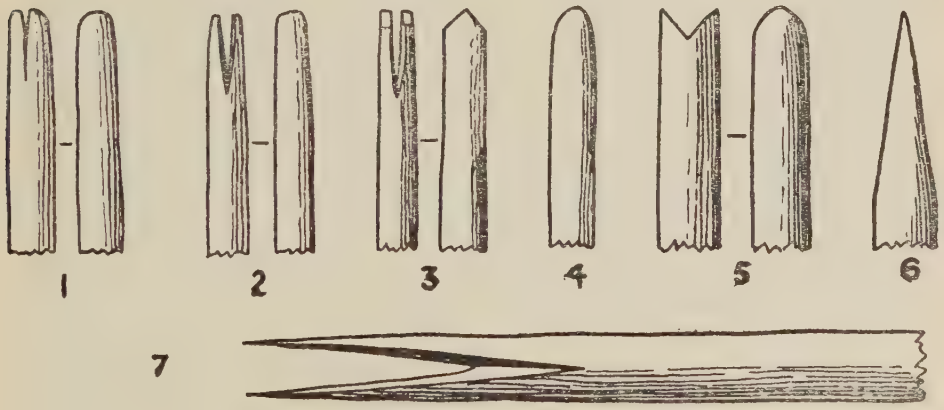


FIG. 5. WOODEN ARROW-SHAFTS FROM STELLMOOR, AHRENSBURG
nos. 1–6, varieties of tip; nos. 1–3, split or forked for the insertion of tanged flint points
no. 7, lower end of a normal shaft, showing nick for engaging bow-string. Scale $\frac{1}{4}$
(*After Rust*)

resembling nos. 1 and 2 have each been found with the tangs of flint points still in position, while one like no. 3 was discovered in a reindeer's breast complete with its tanged flint point of characteristic Ahrensburg form. Variants of the latter group are shown by nos. 4–6 on the same illustration. A specimen of the no. 4 type was found sticking in a dorsal vertebra of a wolf. Although the head of the shafts was treated in so many different ways the base was invariably provided with a nick for engaging the bow-string (no. 7). No complete bow has been found—only two uncertain fragments—but that this formed a principal weapon of the Ahrensburg people is beyond dispute. The existence of such fragmentary remains of the wooden component of an Early Mesolithic culture serves to remind one of a serious lacuna in our

knowledge of the Upper Palaeolithic cultures. Despite the fact that they must often have had to obtain the material from a distance, there can be little doubt that the Upper Palaeolithic peoples of western and central Europe utilized wood, and, indeed, a wood technique is implicit in such a ' type fossil ' as the split-base bone point of the ' Middle Aurignacian '.

Thanks to the Stellmoor excavations it is possible already to indicate with some precision the geographical distribution of the Ahrensburg culture (map, FIG. 2). To the sites with characteristic ' Ahrensburg ' flint industries, already known to exist within the Westphalian-Holstein-Silesian triangle, can now be added the ' Lyngby ' reindeer antler axes, recorded from Jutland, the Danish islands of Fyen, Samsö and Zealand, from south Sweden, and from north Germany from Haltern in Westphalia to Schleswig-Holstein, the Havel lakes of Brandenburg (where they are reinforced by Stimming's harpoons), and the new find at Mittledorf, kr. Mohrungen, in east Prussia. A further extension eastwards may be implied by some bone objects from a contemporary deposit at Abschruten, kr. Pilkallen, east Prussia, but typologically these are indeterminate (Gross, 1937c).

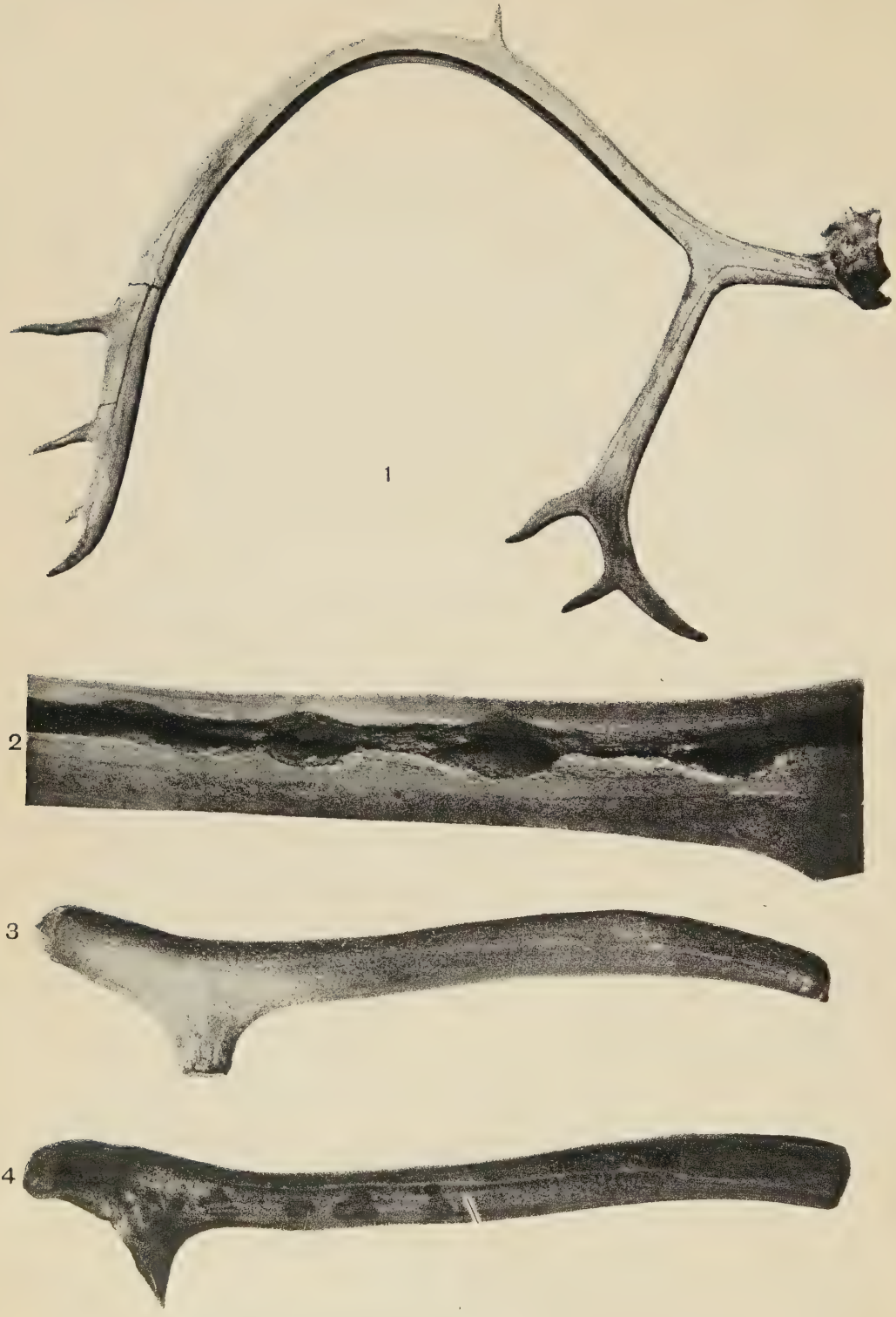
The full significance of the Meiendorf and Stellmoor excavations is difficult to estimate at this short distance of time, but one broad fact stands out clearly : they have bridged what was previously a gap in European prehistory by linking the Mesolithic forest cultures to those of the Upper Palaeolithic tundra. In particular the new finds throw further light on the origins of the Boreal (Maglemose) forest culture. It has been realized for some time that the roots of this virile culture must have been composite. Three main strains are to be distinguished (Clark, 1936, 131) :—a microlithic element, which has been ascribed to penetration of the northern area by the ' Tardenoisian ' culture in an early stage of development, a heavy element (antler, bone, stone and flint axes, adzes and clubs) reflecting adaptation to forest conditions, and lastly certain reminiscences from the old Upper Palaeolithic tradition (burins, ' harpoons ', art). Schwantes (1925) has argued persuasively for the origin of the heavy element in reindeer antler prototypes, and the discovery of the ' Lyngby ' antler types in their true natural and cultural contexts has gone far to substantiate his original contention. Moreover, the discovery of an Upper Palaeolithic antecedent in the heart of the Ahrensburg and Maglemose culture areas has provided a mechanism, whereby elements from an Upper Palaeolithic tradition as assumed by the present writer (Clark, 1936, 132) may

PLATE I

MEIENDORF: REINDEER ANTLERS AND BONES IN POSITION ON THE 'FLOOR' OF THE POND

facing p. 168

PLATE II



1. Reindeer antler: from the inner side a long splinter has been detached. (*After Rust*).
2. Burin-cuts and marks caused by implements in detaching splinters. (*After Rust*).
3. Reindeer antler haft from Nørre-Lyngby, Denmark.
4. Reindeer antler axe from Odense, Fünen, Denmark.

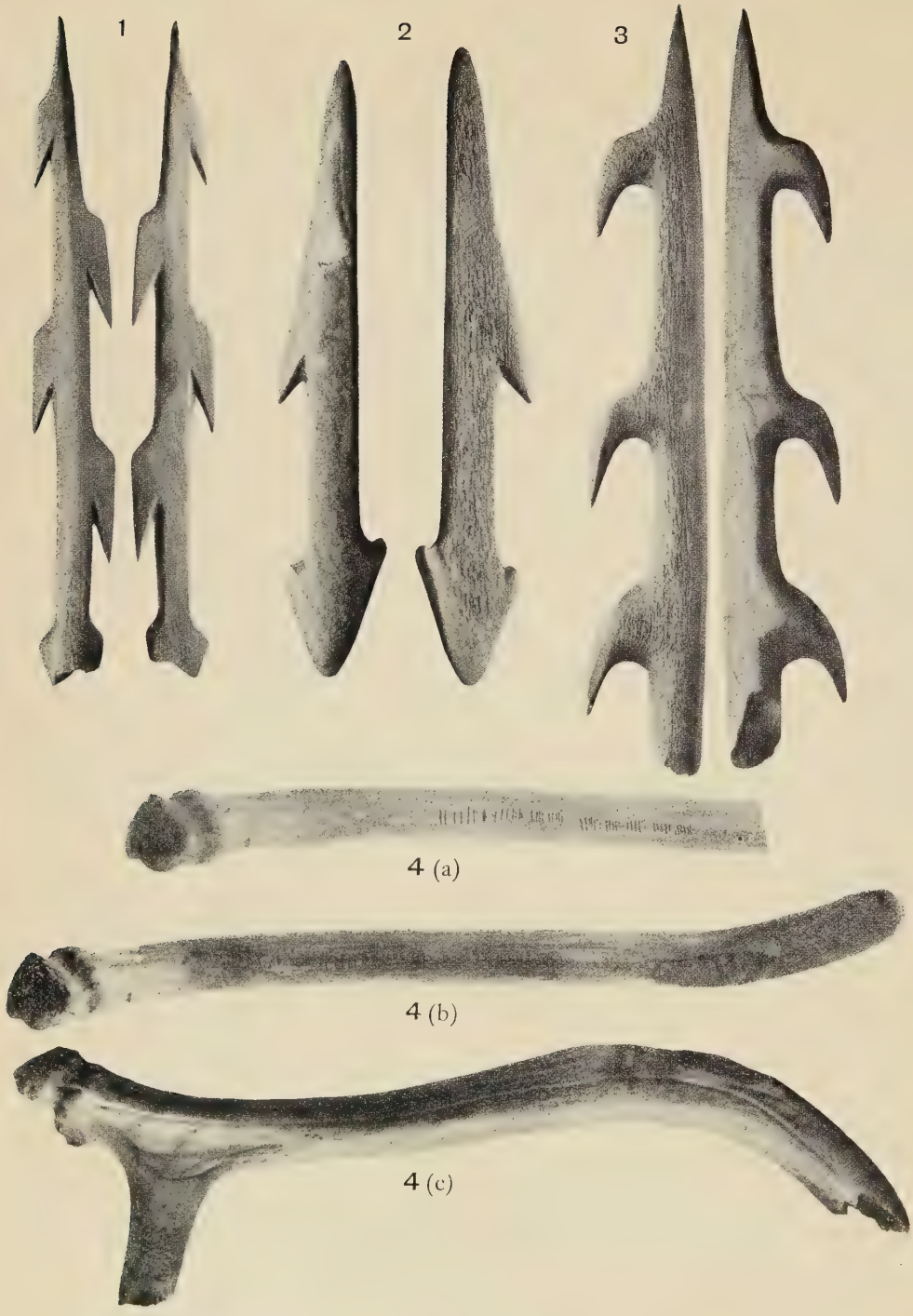
(*National Museum, Copenhagen*)

PLATE III

LEADING HAMBURG REINDEER ANTLER AND BONE TYPES

1. Part of reindeer antler splinter (*span*).
2. 'Harpoon' of antler.
3. Double-ended point.
4. Leather-cutting (?) tool; flint blade missing.
5. Worked wing-bone of goose.
6. Engraving of animal's head, amber plaque.
7. Leather-cutting tool. (*After Rust*)

PLATE IV



LEADING REINDEER TYPES, AHRENSBURG CULTURE, FROM STELLMOOR EXCAVATION

1–3. 'Harpoon' forms. 4 (a-c). So-called 'Lyngby' type of axe (incisions on the back of handle, 4a). (*After Rust*).

have been incorporated in the mesolithic of the region, although from what was said above (p. 164) the identification of these influences with the Magdalenian must be discounted.

To view the new finds in a broader perspective it may be worth recalling the theory, advanced by Sollas (1915, 485 ff.), of some ultimate connexion between the European cave cultures and those of the Eskimo. The human skeletal evidence used by Sollas cannot be checked by finds from north Germany, but many of the features of material culture on which he relied are common also to the Hamburg culture, and it is perhaps in this connexion worth noting a significant fact about the reindeer from the Ahrensburg *tunneltal*. According to Gripp (1937b, 62–72) the Meiendorf reindeer belonged not to the *Rangifer tarandus* race, found at the present day in north Scandinavia, but to Jacobi's *R. arcticus* now living in eastern Asia and North America. It is possible, although this is yet a mere speculation, that some of the reindeer-hunting tribes of the north European tundra of between ten and twenty thousand years ago may have moved north and east as the tundra belt receded in post-glacial times. A further fact worth mentioning is that the closest modern parallels for the ' Lyngby ' antler types are to be found in North America, where early pioneers from Europe found the Cree Indians of Saskatchewan and other Indian tribes using very similar objects made from the same material (Clark, 1936, 84). An example of the variety slotted for the insertion of a blade from the Kenai peninsula, Alaska, and now in Copenhagen Museum may be compared with a similar piece from Odense, Denmark, in the same museum (PLATE II, 3). It is, however, likely that any connexion found by future research to subsist between the two areas will prove to be of the most indirect kind. A leading authority on the archaeology of the Eskimo (Mathiassen, 1936, p. 127) has recently declared his belief that the home of the Eskimo should be sought in Alaska and Siberia : the intervals of time and space are sufficiently vast to encourage the hope that excavations at different points across the expanse of northern Eurasia may yet provide links between the Upper Palaeolithic and Mesolithic cultures of northern Europe and the still living cultures of the ' waste lands ' of North America.

In conclusion, one may be excused for expressing the hope that the brilliant achievements of Professor Gustav Schwantes and his pupil, Dr Alfred Rust, may inspire comparable efforts in Britain. To suggest that the search for Upper Palaeolithic and Early Mesolithic open stations, now directed almost exclusively to glacial and low-lying valley

deposits in eastern England, might with advantage be shifted elsewhere, may seem at the moment ungracious to many earnest workers, but in the long run it is likely to yield results more complete in themselves and at smaller cost. It may well happen that the palaeo-botanists by locating Late Glacial and pre-Boreal plant deposits will give us the first clue, though any hints from quaternary geologists as to where such deposits might be expected to occur would be more than welcome. Finds of reindeer antlers and bones in such deposits might soon lead to the discovery of the summer camps of the reindeer-hunting tribes of Britain. It is by such finds that we can hope to recover those elements of the Creswellian culture (like the Hamburgian itself, an off-shoot from the Gravettian), inevitably either absent from or poorly represented in the caves and rock-shelters from which it is known at the present time. And it is through such finds in silted-up lakes by the ancient ice-margin that we can hope to establish a finer chronology for our Upper Palaeolithic and early Mesolithic cultures.

References

ANDREE, J. (1932) 'Beiträge zur Kenntnis des norddeutschen Paläolithikums und Mesolithikums'. *Mannus Bibl.* no. 52.

BERTSCH, K. (1929) 'Klima, Pflanzendecke und Besiedlung Mitteleuropas in vor- und frühgeschichtlicher Zeit nach den Ergebnissen der pollenanalytischen Forschung'. *Ber. d. Röm.-Germ. Komm.* XVIII, S. 1–67.

BREUIL, L'ABBÉ H. (1912) 'Les subdivisions du paléolithique superieur et leur signification'. *C. R. Congr. Int. d'Anthr. et d'Arch. Préh. Geneva*, pp. 165–238. Re-printed 1937.

CLARK, J. G. D. (1935) (With H. and M. E. Godwin and M. H. Clifford). 'Recent Excavations at Peacock's Farm, Shippea Hill, Cambridgeshire'. *Ant. J.* XV, 284–319.

——— (1936) *The Mesolithic Settlement of Northern Europe.* Cambridge University Press.

GAERTE, W. (1926) 'Auf den Spuren des ostpreussischen Mammut- und Rentierjägers'. *Mannus Z.*, BD. 18, S. 253 ff.

GRIPP, K. (1935) 'Die erdgeschichtlichen Aufschlusse der Grabung Stellmoor'. *Nachr. für Deutsche Vorzeit*, 1935, S. 230.

——— (1937a) 'Die Geologische Untersuchung des Rentierjager- fundplatzes Meiendorf'. (See Rust, 1937a, S. 1–9).

——— (1937b) 'Die Rengeweihstangen von Meiendorf' (See Rust, 1937a, S. 62–72).

GROSS, H. (1937a) 'Pollenanalytische Altersbestimmung einer ostpreussischen Lyngbyhacke und das absolute Alter der Lyngbykultur'. *Mannus Z.*, BD. 29, S. 109–13.

Gross, H.	(1937b)	'Der erste sichere Fund eines paläolithischen Geräts in Ostpreussen'. *Mannus Z.*, bd. 29, s. 113–18.
———	(1937c)	'Die ältesten Spuren des Menschen in Nordostdeutschland' *Nachr. für Deutsche Vorzeit*, 1935, s. 230.
Krause, W.	(1937)	'Die eiszeitlichen Knockenfunde von Meiendorf'. (See Rust, 1937a, s. 48–61).
Mathiassen, T.	(1936)	'The Eskimo Archaeology of Julianehaab District'. *Medd. om. Grønland*, bd. 118, no. 1, pp. 1–140.
Nordmann, V.	(1936)	*Menneskets Indvandring til Norden.* Copenhagen.
Popping, H. J.	(1931)	'Nederlandsche Praehistorie. Een Magdalenien Station op de Veluwe'. *De levende Natur*, 35.
——— and J. Bezaan	(1932)	'Nederlandsche Praehistorie, Het Jong-Palaeölithikum. Elspeet II'. *De levende Natur*, 36.
Rust, A.	(1936a)	'Die Grabungen bei Ahrensburg (Grabung Hof Stellmoor)'. *Nachr. für Deutsche Vorzeit*, 1936, s. 229–32.
———	(1936b)	'Die Grabungen beim Hof Stellmoor'. *Offa*, bd. 1, s. 5–22.
———	(1937)	*Das Altsteinzeitliche Rentierjägerlager Meiendorf.* Neumünster.
Schmidt, R. R.	(1912)	*Die Diluviale Vorzeit Deutschlands.* Stuttgart.
Schütrumpf, R.	(1935)	'Pollenanalytische Untersuchungen der Magdalenien und Lyngby-kulturschichten der Grabung Stellmoor'. *Nachr. für Deutsche Vorzeit*, 1935, s. 231–8.
———	(1937)	'Die paläobotanisch-pollenanalytische Untersuchung'. (See Rust, 1937, s. 11–47).
Schwabedissen, H.	(1937)	'Die Hamburger Stufe im nordwestlichen Deutschland'. *Offa*, bd. 2, s. 1–30.
Schwantes, G.	(1925)	'Das Beil als Scheide zwischen Paläolithikum u. Neolithikum' *Archiv für Anthrop.*, n.f. xx, s. 13 ff.
———	(1928)	'Nordisches Paläolithikum und Mesolithikum'. *Mitt. Mus. Völkerk. Hamburg*, xiii, s. 159 ff.
———	(1931)	'Die Bedeutung der ältesten Siedlungsfunde Schleswig-Holsteins für die Weltgeschichte der Steinzeit'. *Festgabe für Anton Schifferer.* Breslau.
———	(1932)	'Eine neue jungpaläolithische Zivilisation in Holstein'. *Nachr. für Deutsche Vorzeit*, 1932, s. 183–7.
———	(1934)	*Geschichte Schleswig-Holsteins*, bd. 1, lief. 1. Neumünster.
Sollas, W. J.	(1915)	*Ancient Hunters.* 2nd ed. London.
Stimming, R.	(1928)	'Die Ancyluszeit in der märkischen Havelgegend'. *Archiv für Anthrop.*, b.d xxi, s. 109–21.
Woldstedt, P.	(1929)	*Das Eiszeitalter.* Stuttgart.
———	(1935)	'Die Bezeihungen zwischen den nordischen Vereisungen und den paläolithischen Stationen in Nord- und Mitteldeutschland'. *Mannus Z.*, bd. 27, s. 275–87.
Zamiatnine, S.	(1934)	'Gagarino'. *Bull. Acad. de Hist. de la Culture Matérielle*, fasc. 88.

The Churches of Palestine and their Influence on Early Christian Architecture*

by Alfons Maria Schneider

THE churches of the Holy Land play a very special part in the lengthy controversies as to the origin and formation of the Christian basilica, since particular significance is attributed to them as constituting a norm from which the basilica type developed. For example, Wulff remarks :[1] ' If any region anywhere played a leading part in the development of the early Christian basilica, it is Palestine, including the whole coast of Syria to Philistia, where, under Constantine the Great, building was already developed with the express purpose of fostering the cult in the holy places '. This view, illuminating in and for itself, is today generally accepted ; it cannot, however, be maintained against the result of recent excavations. In this article chief emphasis is laid on the churches of Constantine, which are of especial importance not only because of their age, but in particular because they stand on the most sacred places of Christendom.

According to Eusebius (*Vit. Const.*, 3, 25–43, 48–53), the first Christian emperor and his mother Helena between them built four churches (1) the Church of the Sepulchre at Jerusalem ; (2) the Church of the Nativity at Bethlehem ; (3) the Eleona Church on the Mount of Olives, and (4) the Shrine of Mambre at Hebron. At the present day we have satisfactory knowledge of the last three, but of the Church of the Sepulchre we unfortunately still know too little.

The Church of the Sepulchre

It would be foolish to attempt to add yet another to the 25 already existing reconstructions of Constantine's lay-out ; that would make confusion worse confounded.[2] Only the excavator's spade can bring certainty ; let us hope that it will soon be achieved. My FIG. 1 is

* Translated by Professor R. G. Austin.

[1] *Altchristliche und Byzantinische Kunst* (Potsdam, 1914), 205 f.

[2] See Vincent-Abel, *Jérusalem nouvelle* (Paris, 1914).

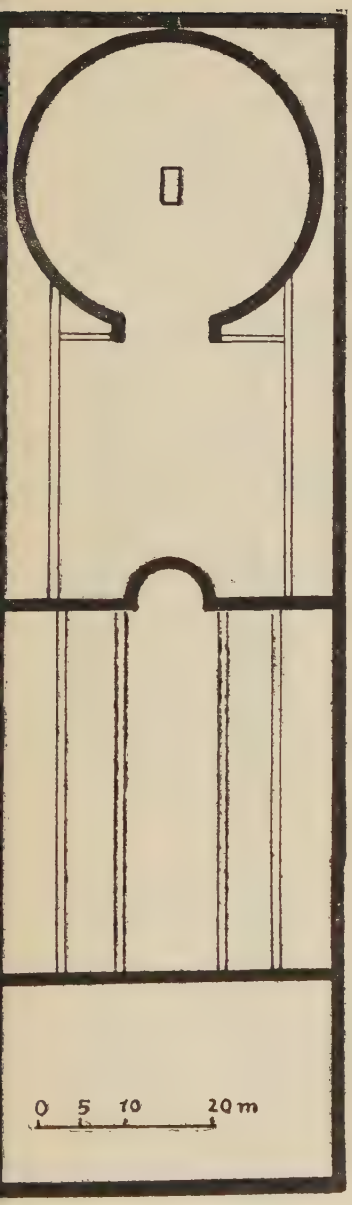


FIG. 1. CHURCH OF THE SEPULCHRE, JERUSALEM

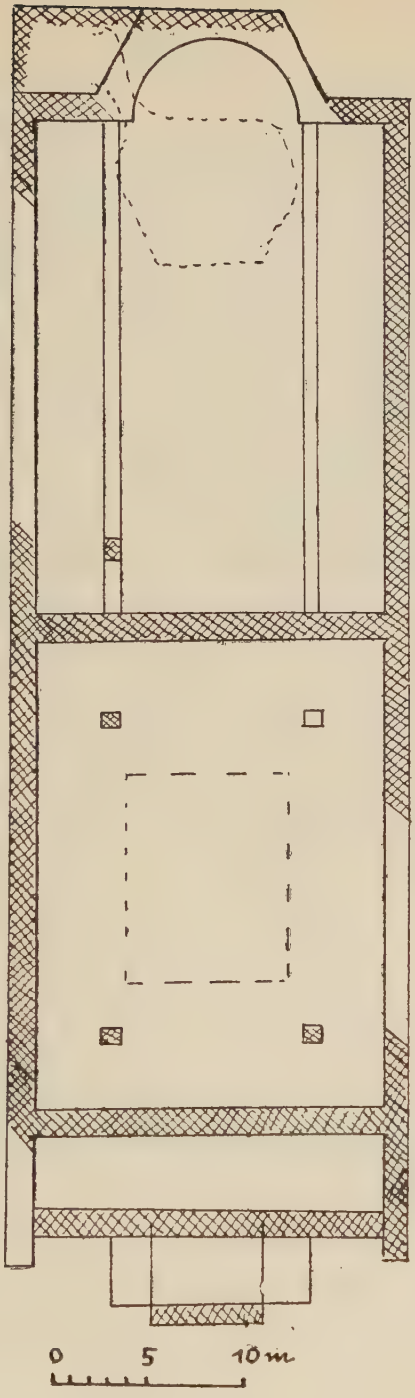


FIG. 2. ELEONA CHURCH, MOUNT OF OLIVES

FIG. 3. SHRINE OF HADAD, ROME

therefore only a provisional sketch, to explain the accounts of Eusebius and other writers. There are three separate divisions : the tomb (Anastasis), a domed chamber with twelve inner supports ; a courtyard or atrium, lying open to the sky, surrounded by three porticoes, and containing the rock of Golgotha (not mentioned by Eusebius) ; the basilica (Martyrion), a five-naved, double-storeyed hall, with entrance court which opened towards the west and was entered from the east by a propylaeum, the remains of which were found in 1898 during the building of the Russian hospice.

Now it might appear as if this unusual arrangement is simply to be explained from topographical considerations ; but that is not so, for the lay-out shows marked similarity to the shrine of the Syrian Hadad on the Janiculan hill in Rome (FIG. 3).[3] There we have a central building as the Hall of the Mysteries, which contained the tomb of a Syrian Sun-God, identified at the same time with Aion. Connected with this is an open courtyard or atrium, and finally there is a three-naved cult-chamber containing the image of Jupiter Syrius, which stands in an apsidal conch. It can scarcely be denied that this building bears very close relationship to the Church of the Sepulchre. We learn from the Byzantine chronicler Theophanes (I, 33 de B.) that the architect of the Church of the Sepulchre was called Zenobius, who from his name was probably of Syrian origin. He had then taken over a native architectural scheme, which could be quite easily adapted : Christ is the true *Sol salutis*, and the King of Eternity risen from the grave.

The Church of the Nativity

The latest excavations have definitely and quite remarkably solved an old problem concerning the history of the building of the church.[4] The lay-out of Constantine (FIG. 4), now clearly recognizable, with its octagonal chamber over the mystic grotto, and the adjacent five-naved basilica, is nothing more than an abbreviated adaptation of the Syrian scheme, from which, as we saw, the Church of the Sepulchre is also to be derived. Both churches, therefore, are specialized cases, which are not decisive for the further development of ecclesiastical architecture,

[3] P. Gauckler, *Le sanctuaire syrien du Janicule* (Paris, 1912), and F. J. Dölger, *Der heilige Fisch* (Münster, 1922), 182.

[4] Vincent-Abel, *Betléeme, le sanctuaire de la nativité* (Paris, 1914) ; Richmond, *Quart. Dpt. Antiquit. Palest.*, 1935, 75 f., 1936, 63 f. ; Vincent, *Rev. Biblique*, 1936, 544 f. ; Harvey, *Structural survey of the Church of the Nativity at Bethlehem* (London, 1936).

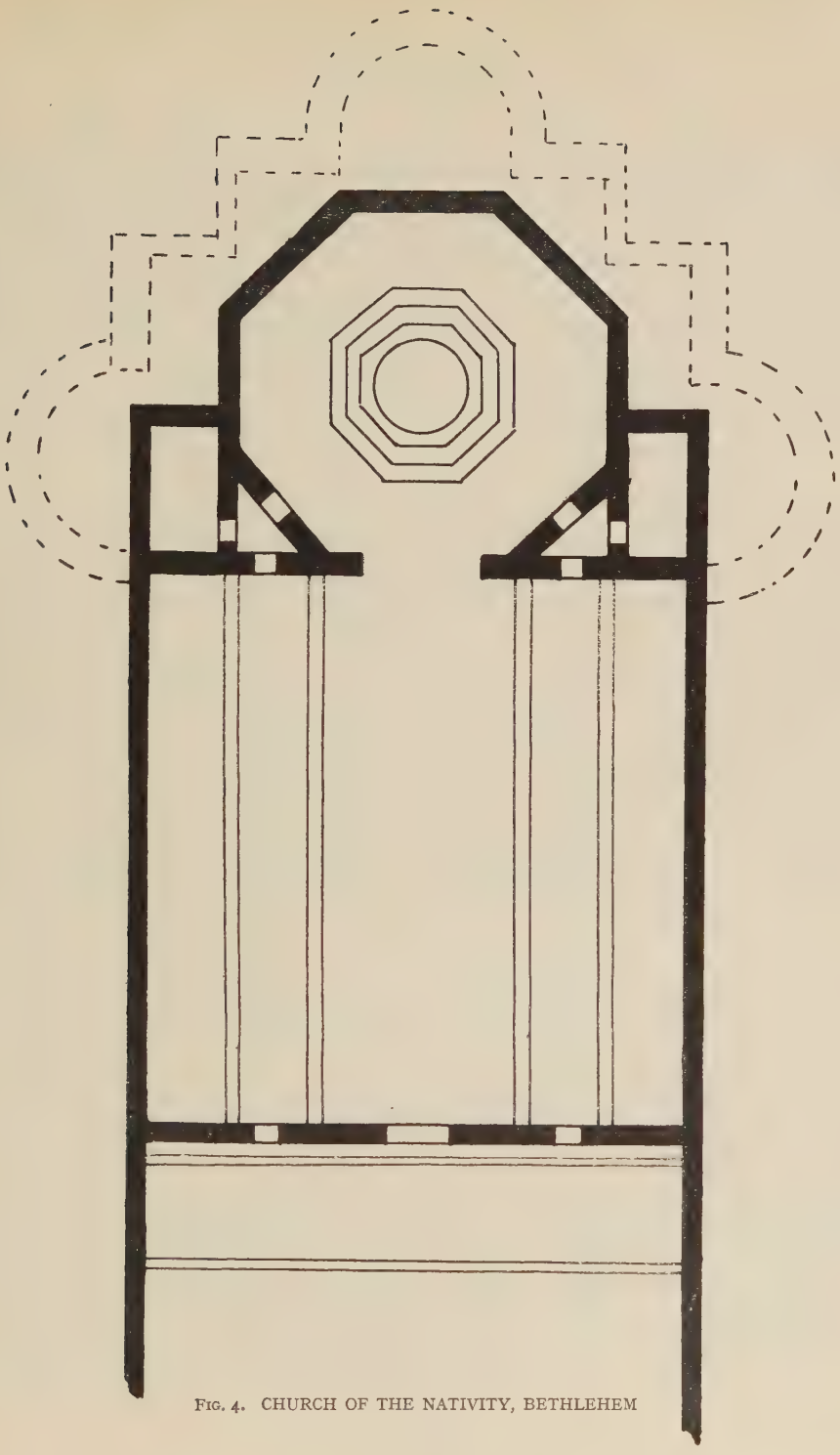


Fig. 4. CHURCH OF THE NATIVITY, BETHLEHEM

but have merely an *ad hoc* significance. The fundamentally Syrian-syncretic lay-out may have something to do with the reason why it was only used in one other place, so far as I know, and that, significantly enough, in the Church of the Tomb of Constantine at Byzantium. Unfortunately we know very little about the plan of this church ; we can only say for certain that there was a basilica, at the east end of which rose the rotunda containing the tomb of Constantine, in which he rested as the thirteenth apostle among the other twelve. Weinreich's researches[5] into the question of the ' thirteenth god ' first showed us Constantine's real meaning : it is nothing more than a substitute for the pagan apotheosis of the Emperors. Just as the ancient hero could join the twelve Gods and thereby receive the dignity of being the thirteenth—Philip, Alexander, Hadrian, and Septimius Severus, among others, became the ' thirteenth God ' in this manner—so Constantine set himself at the head of the apostles ; one might almost say in fact that he put himself in the place of Christ, to whom alone that position properly belongs. This symbolism, which is only too plain, was after regarded as inadmissible ; consequently the cenotaphs of the twelve apostles disappeared as early as the time of Constantius, who turned the ' Heroon ' into a mausoleum for his dynasty. The parallel with the Church of the Sepulchre in Jerusalem seems to me in this case a striking one, especially in the light of Eusebius' statement that round the tomb of Christ also there stood twelve pillars as symbols of the Apostles. Otherwise, the scheme of a central building with adjacent basilica was not used again, because it was nowhere else appropriate.

The Eleona Church on the Mount of Olives

This church, built by Helena to commemorate the Ascension, was excavated shortly before the war, and an account was given of it by Vincent (*Rev. Bibl.*, 1911). However, it did not stand on the actual site of the Ascension (which was only later discovered), but above a grotto, in which, according to Eusebius, ' the Saviour of the world initiated the Apostles into the secret mysteries '. Naturally, there is no question here of a biblically-attested site, any more than is the case with the grotto below the Church of the Multiplying of the Loaves and Fishes at Et-Tabgha, which since the end of the fourth century has been considered as the place from which Christ uttered the Beatitudes (Matthew 5, 3 ff.) Grottoes always had something mysterious about

[5] *Triskaidekadische Studien*, 1916, 3 f. (*Religionsgesch. Versuche und Vorarbeiten* 16, 1).

them for the ancients : consider the part they play in Pausanias (*e.g.*, X, 32, 2 ff.), and later in the Neoplatonists. Unfortunately little is left of the Eleona Church, only the ground-plan, and that is not certain in all respects (FIG. 2). The lay-out is about 60 m. long and 22 m. wide ; it contains a three-naved basilica, the shape of whose eastern end cannot be determined (it was possibly round or rectangular), and a rather deeply set atrium with a propylaeum. As in the case of the older church at Bethlehem, there was no narthex. Thus the building has no important special characteristics, but is to be regarded as an unimportant variant of the basilica type.

The Shrine of Mambre at Hebron

We know from Eusebius, Sozomenus (*Hist. Eccl.* 2, 4), and others, that Constantine built a church ' in mercato Terebinthi ', in honour of Abraham, on the site of a syncretic cult-place. It was destroyed by the Persians in 614, and then rebuilt in a poor sort of way by Modestus, but fell into decay after the conquest of Palestine by the Arabs, and ultimately became completely forgotten. Recent archaeologists searched for it in all sorts of places round Hebron, until in 1918 E. A. Mader, in his book *Altchristliche Basiliken und Lokaltraditionen in Südjudäa*, decided in favour of a position some three km. north of Hebron, surrounded in the manner of a temenos by a circle of large, carefully-hewn stones, measuring 65 by 49 metres. This place was called Harām rāmet el khalīl = ' place of the Height of the Friend (God) '; it had naturally long been known to travellers, but was regarded at different times as Idumaean, Jewish, Byzantine or Arabian. It was not until Mader undertook his excavations in 1926[6] that a complete solution of the various problems became available. It was then established that the eastern half of the temenos, belonging to the period of Hadrian (FIG. 5, the part in black), was covered by a remarkable structure, which is undoubtedly to be identified with Constantine's church. The lay-out is abnormal in several ways : it is as broad as it is long, it has a narthex which is laterally extended in a curious manner, and on the northeast and southeast side there are adjacent two almost square rooms, which may probably be regarded as sacristies or as the lodging of the pilgrims' priest. This unusual arrangement can be easily explained from topographical considerations ; as it was desired to use the western half of the temenos area as a market-place, the church

[6] *Rivista di Arch. Crist.* 1929, VI, 249 f.

necessarily had to be built in this compressed form. So it is once more a special case, and as such had no influence in after-times on the development of the normal basilica type.

Accordingly, of the churches which I have described, only the Eleona church shows a normal scheme ; the churches of the Sepulchre and of the Nativity were reverenced as the most holy pilgrim churches of Christendom, but were not imitated. Churches were certainly built in many places ostensibly to recall biblical sites ; for

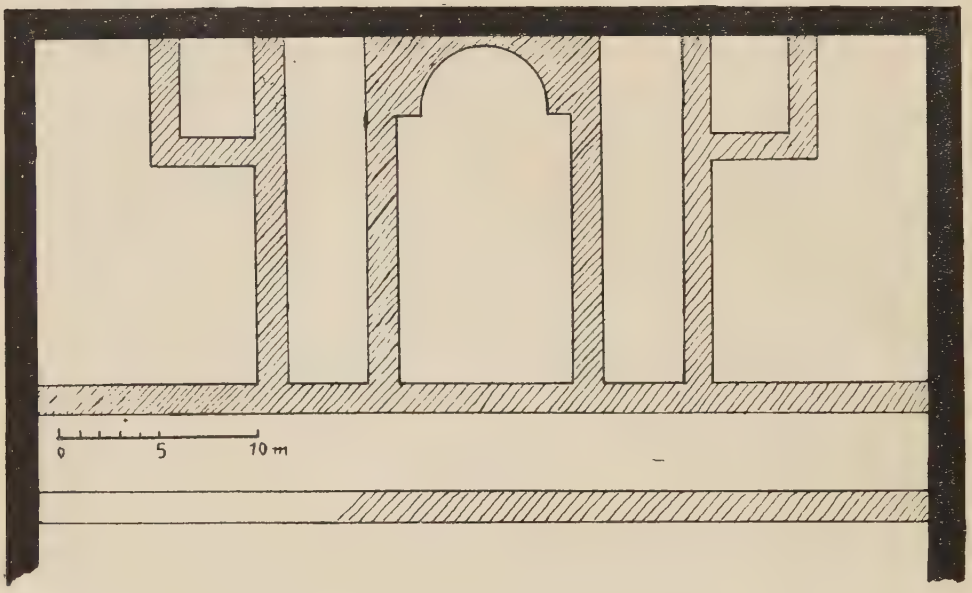


Fig. 5. THE SHRINE OF MAMBRE AT HEBRON

instance, Santa Maria Maggiore at Rome, which is even called ' Ad praesepe', or the churches of Bethlehem, of the Cross, and of Sion, as we find them especially in Armenia and in Georgia. But the actual churches in question were not closely copied, and at the most the rotunda-form of the Anastasis was used ; yet this too was adapted to suit local needs, as may be seen from the Martyrion of SS. Carpus and Papylus, at Constantinople,[7] which I discovered, and which in literary sources is expressly stated to be a copy of the Jerusalem rotunda (FIG. 6). The Church of the Nativity, reconstructed at the beginning of the

[7] Byzanz. *Istanbuler Forschungen* 8 (Berlin, 1936), 1 ff.

sixth century (FIG. 4) has exercised an influence outside Palestine ; but only with any significance in the provinces. Two churches have lately been excavated in Epirus,[8] which clearly show the influence of Bethlehem

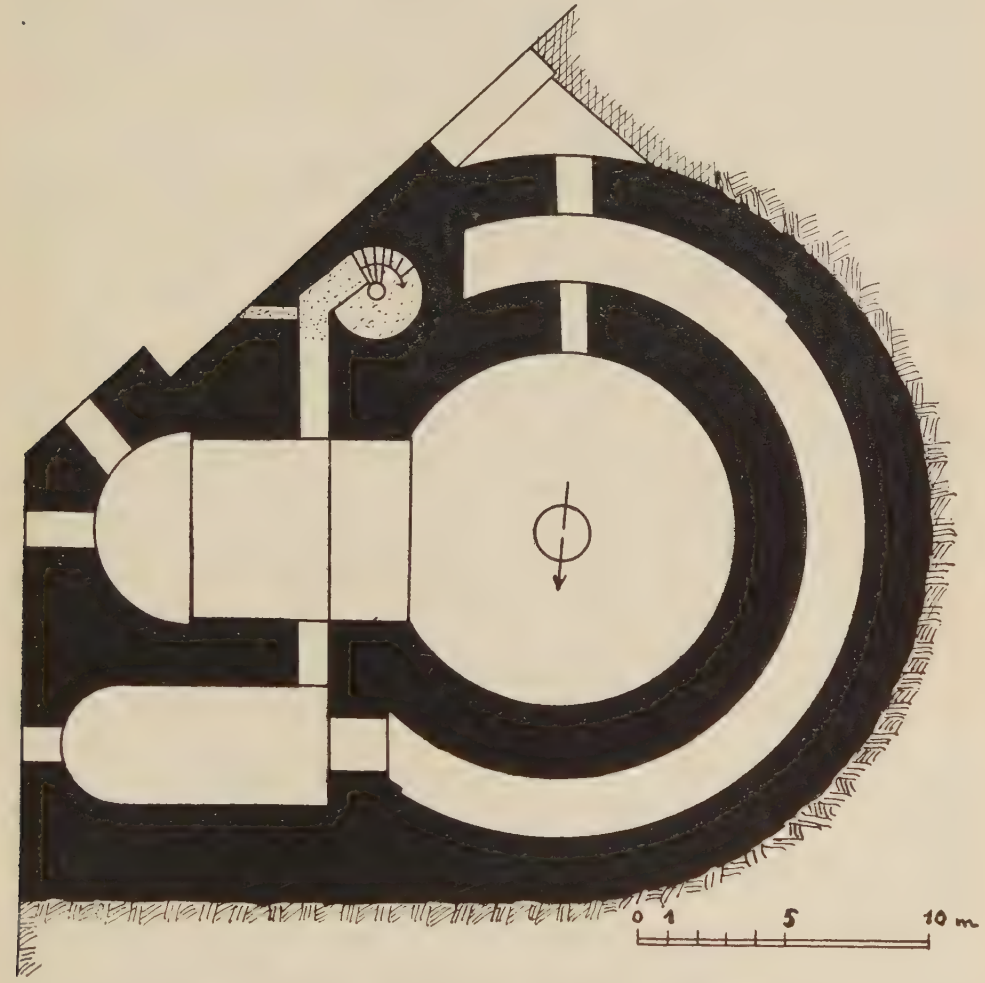


FIG. 6. MARTYRION OF SS. CARPUS AND PAPYLUS, CONSTANTINOPLE

in their striking triple-conched apse : I allude to the modest basilicas at Dodona (FIG. 7) and Paramythia, which may be ascribed to about the middle of the sixth century. However, even this type had no influence on

[8] *Arch. Ephemeris* 1929, 204 f.

the great architecture of the West and East. The reconstruction shows no specially happy architectural treatment ; particularly awkward is the superstructure of the central space at the intersection of the nave and transepts ; a triumphal arch, as in the Roman churches, would have been more satisfactory. But the treatment employed at Bethlehem is not unique of its kind ; for instance, the rather older basilica of Mena at Alexandria shows an exactly similar feature, and this in its turn probably goes back to an ancestor in the city of Byzantium. The arrangement had no long life, however, but was soon improved upon (cf. the Justinian Church of the Apostles at Byzantium, and the Church of Theologos at Ephesus). In other words : the basilica of Mena and that of the Church of the Nativity are a transition-type, which could have an influence only in the provinces because it soon becomes obsolete.

However, since Constantine's day, many churches and monasteries were built in Palestine ; and therefore an individual Palestinian style might be expected to have evolved for the later period, which in turn would have reacted on the general development. But on closer examination we must deny this also, for obvious reasons. Palestine was from ancient times a corridor-country, or rather, an advance-base for the great Powers of Further Asia. Since, apart from the period of the Israelite kings, it never had political independence, it could not develop an independent culture of its own. This accounts for the fact that the prosperity of the land, which neither formed a religious nor a racial unity, was ruined by the revolts under Vespasian and Hadrian. Only the coastal strip, with its Hellenized population, remained intact ; but this was not converted to Christianity until the 5th century. Before the time of Constantine, Christianity played no great part in the country except in Caesarea the capital ; the few communities were small, poor, and without influence. Even after Constantine, the new religion gained ground only with difficulty. In 552 the Emperor Gallus had to put down with much slaughter a revolt of the Jews in Galilee, which was probably caused by the Christianizing tendencies of the Government ; and Samaria was only pacified in Justinian's time by measures of Draconian severity ; while even at the end of the century, Christian pilgrims, such as the anonymous writer of Piacenza, complain bitterly of the knavery which they experienced in their journey through Samaria. When the Persians invaded the country in 614, Jews and Samaritans immediately uprose, and rivalled the Persians in burning down churches and monasteries. Christianity really only gained a firm footing among

the convert heathen of the Greek cities and of the half-settled Arabian peoples of southern Judaea. The many pilgrim churches and most of the monasteries were also founded by foreigners ; to give only a few examples :—the church of Garizim built by the Emperor Zeno, the church of St. Stephen built by Eudocia, the Nea of Justinian, the

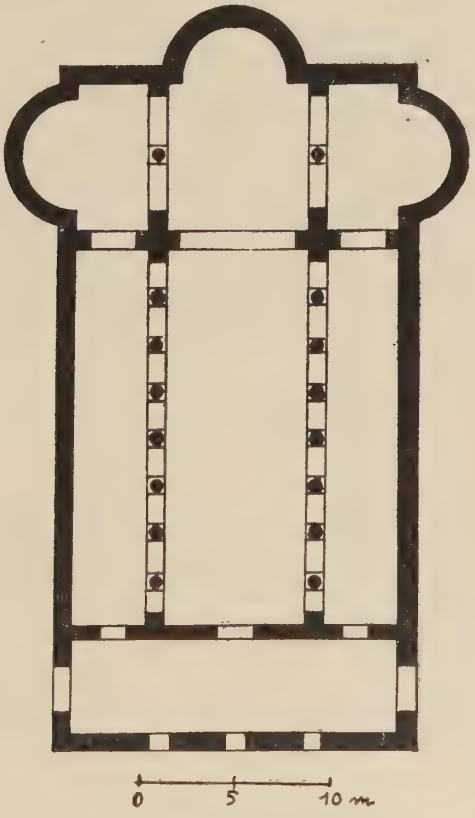


Fig. 7. BASILICA AT DODONA

church of the Sepulchre of Mary built by Mauricius, the Bishop's church at Gaza—for the erection of which the Egyptian court provided not only money and marble, but also the plans for building—or the Imbomon church on the Mount of Olives, erected by the Roman lady Poimenia. Very instructive in this connexion are the 200 dipinto inscriptions, which I collected from a burial vault in the monastery of

Choziba at Jericho, and published in 1931 in the *Römische Quartalschrift*. The names of the monks are Greek or Roman ; Semitic-Arabian are entirely lacking. In about 60 cases the family of the dead man is given. We find a few from Gaza, Ascalon, and Caesarea, while the rest come from practically all the provinces in the Empire. Therefore the main Christian stratum consisted of foreigners, who set a cultural tone, and naturally introduced everywhere their artistic influence. It is not surprising, therefore, that many buildings show a pronounced mixture of styles, which is especially clear in the Church of the Multiplying of the Loaves and Fishes at Et-Tabgha, which I have described.[9] Therefore, the importance of Palestine for the history of art lies not in what it gave to the Christian world, but in what the Christian world gave to it. But it is so far important to us, in that we can discover in Palestine —just because so many churches were continually being built there— many otherwise lost intermediate links in the great chain of development of ancient Christian architecture outside Palestine.

[9] *Church of the Multiplying of the Loaves and Fishes*: trans. by A. A. Gordon (London, Coldwell, 1937), 35 ff.

Ancient Fields in Manaton Parish, Dartmoor

by Alfred H. Shorter

IN the district around the valley of the West Webburn stream which cuts north-south through eastern Dartmoor, Grimspound seems to attract most attention. I have found no reference to the old field boundaries and terraces which lie in this district, mostly within the western part of the parish of Manaton. This article deals with fields within, or adjacent to, the Manaton parish boundary, but there are also sets of terraces which I have observed, but not yet explored, mainly to the east of the Widecombe-Grimspound road, opposite Blackaton Manor. These terraces appear to be very similar to those described here, and as they are outside Manaton parish the connexion between the terminations of some sets of terraces and the parish boundary which, from the plan, appears to be significant, must not be emphasized.

The discovery of different types of field boundaries in the district by Col. Ransom Pickard and myself, was late last summer, when it was difficult to survey, because of the dense growth of bracken on this part of the moor, and to excavate, because of weather conditions and the delay in obtaining sanction. It is hoped that this summer excavation and detailed measurement will be possible. The approximate positions of the various discoveries are shown on the accompanying sketch-plan, and the principal features of interest may be grouped under the following headings :—

Terraces

Some of the lynchetted fields on Dartmoor (e.g. at Kestor and Trowlesworthy) have been described.[1] At Porthmeor[2] and Chysauster[3] in west Cornwall, there are numbers of small, terraced fields, but there

[1] E. C. Curwen, ' Prehistoric Agriculture in Britain ', Antiquity, 1927, I, 283.

[2] F. C. Hirst, ' Notes upon three Excavation Sites in Zennor ', *West Cornwall Field Club*, p. 2.

[3] H. O'Neill Hencken, ' An Excavation by H.M. Office of Works at Chysauster, Cornwall, 1931 '. *Archaeologia* 1933, lxxxiii, 238.

seems to be no other example of terracing such as that found in the Challacombe area, in either Devon or Cornwall. Most of the terraces to be described are on both sides of the valley in which Challacombe farm stands, and in the valley further west on the slope facing Soussons. The two streams come together to form the West Webburn river, and there are terraces on the 'nose' of the spur between the valleys, and on the north-facing slope of a saddle, looking up the Challacombe valley. There are also traces in a field nearby (A).[4]

These terraces in most cases roughly follow the contours. They are of different lengths and widths, and there seems to be no standard. Several are about 150 yards in length, but even in the apparently well-preserved, compact set (B), the terraces are not all of the same dimensions. The section taken across this set shows the variations in width.

SECTION Y–Z (*see* plan, p. 185). 1 inch—72 feet.

PLATE I shows the set as seen from the other side of the valley. PLATE IV, 2 gives an example of the banks or heaps of stones behind which, so it appears, the soil was placed to make the level parts. These banks of stones contain huge blocks of granite as well as small rocks, and are clearly shown in many of the terraces. At C are very small terraces, only a few inches in depth, and with intervals of 32 or 50 feet between pairs. These are situated on a relatively moderate slope, and on the ground near them there are numerous heaps of stone. Most of these seem to be scattered indiscriminately, but a few are in line and roughly parallel to the small terraces. The heaps are about three feet across and 18 inches high, except one large mound of stones (D), and all seem to consist of material which was ready to be used in making further terraces. It may be impossible to find when the process of cleaning and preparing this 'newtake' at such a great height on the

[4] The capital letters refer to the sketch-plan.

PLATE I

ANCIENT FIELDS, MANATON, DEVON: TERRACES AT B (*see* p. 184)

facing p. 184

ANCIENT FIELDS, MANATON, DEVON: TERRACES FACING SOUSSONS

Note the banks of stones and boulders (*see* p. 186)

ANCIENT FIELDS, MANATON, DEVON: TERRACES IN FIELDS R AND S

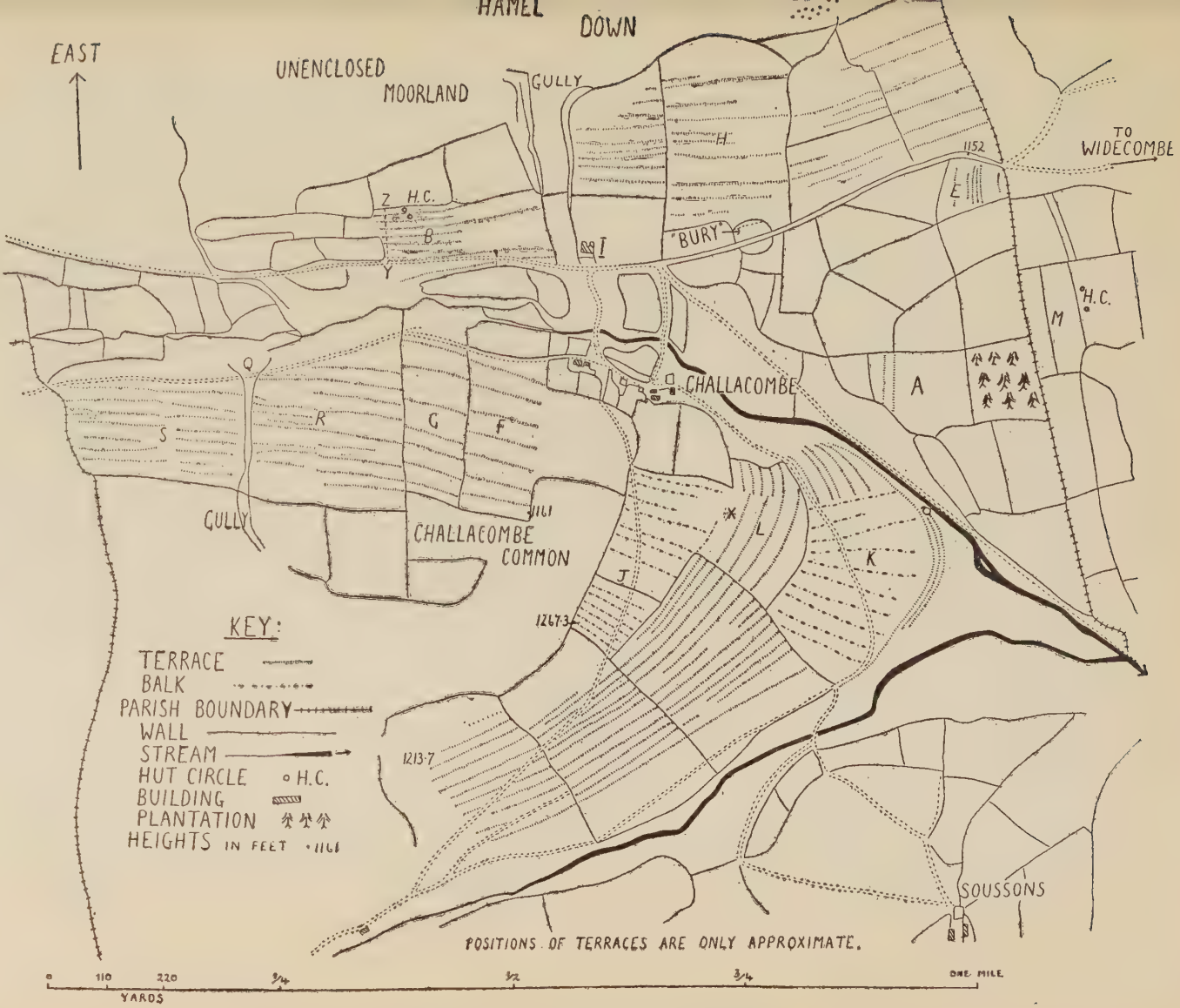
PLATE IV

1. TERRACES IN FIELDS R AND S

2. BANK OF GRANITE BLOCKS AND STONE AT B, MADE TO SUPPORT THE SOIL IN THE TERRACE

3. WALL OF HUT CIRCLE ON TERRACES AT B

ANCIENT FIELDS, MANATON, DEVON



ANCIENT FIELDS, MANATON PARISH, DARTMOOR

moor was abandoned. In field E the type of terrace is very similar to that just described, and the banks are shallow and have short distances between them. They are being effaced, for this field is constantly used for pasturing cattle.

The terraces which face across to Soussons are illustrated in PLATE II. Some of these are riddled with rabbit-holes, and some have been partially obliterated, so that it is almost impossible to give accurate positions. Most of them show certain evidence of the erection of banks of stones, and there are not a few dumps of small stones. The lengths and distances apart of the terraces vary somewhat, as they do on the western side of the Challacombe valley. The slope on this side is generally steeper and, instead of a width of 30 to 40 feet, which is found between some of the consecutive terraces at B, the general slope measurements between terraces in fields F and G are 90, 120, or sometimes even 150 feet (round figures). PLATES III and IV, 1 show some of the terraces on this side and how, near Q, and a few other places, it is difficult to determine the exact positions owing to the activities of tin-streamers in cutting gullies and in dumping debris, and to the way in which a path has interfered. However, these features do help to show that, since both the gullies near Q and the Widecombe-Grimspound road cut through the terraces, the latter must be older than both. Most of them are in sets which interlock (see PLATE III) and at these dividing lines between sets there is sometimes a wall, sometimes not ; some of these walls are very winding and often broken down, and although they follow the plan of some of the terraces, they may not be contemporary with them.

Around Challacombe farm some terraces have been removed by ploughing, not only in fields such as H, but also near the road ; the present farmer has removed a number of ' walls ', and some of the stone-banks have been raided for road-metal. The site of an old farmhouse is where there are now two barns (I), and this, like Challacombe, seems to have been close to terrace-systems. The house is marked on the tithe map of *c.* 1840,[5] and there was a public house near the farm. It is probable that the population of the valley was much more numerous early last century and, although one must allow for the effects of tin-streaming, there is a strong suggestion that, at some recent period in history, cultivation must have been much more widespread in the area. The present farmer says that ' at one time '

[5] In the offices of the Diocesan Registry, Cathedral Close, Exeter.

300 acres of the lands around Challacombe were under corn. After the Napoleonic wars the price of wheat was very high, and until the repeal of the Corn Laws became effective it is probable that many parts of the moor were brought under cultivation. There are many traces of ridge-and-furrow in fields near the Moretonhampstead-Princetown road almost opposite the spot where the road from Widecombe via Challacombe comes in. Here, as on Soussons Down, the ridge-and-furrow marks are mainly up and down the hillside. Although in fields where there are terraces there is no trace of ridge-and-furrow, it seems possible that these were cultivated in the early nineteenth century.

Balks

These are banks of stones and earth, 3 to 6 feet wide and only a foot or so in maximum height, and they go up and down the spur. Like the terraces, they are by no means straight, and in J are spaced at irregular intervals varying from 30 to 100 feet, while in K they splay out down to the bottom of the slope, where accumulation of soil has undoubtedly increased the size of the very large terrace and two smaller terraces there. In field L there is a dump of stones at X; there are fairly distinct terraces, but no trace of the up-and-down banks, and the fact that these latter are present in J and K suggests that they may possibly have been continuous; in L they may have been obliterated, and replaced, by a separate system of terracing. If this is so, one bears in mind the process deduced by W. P. Hedley[6] in Redesdale and at Housesteads, Northumberland. There, 'the lynchets are formed of rough boulders taken off the cultivated strips and in no case is there any trace of true walling'. This description applies to the balks in fields J and K, but a full comparison is not urged. Hedley suggests a Celtic origin for these up-and-down 'lynchets', which run north and south on the site he describes, and supports his suggestion with place-name evidence. Now, in Devon, Saxon penetration into the county was slow, but complete in its influence on names,[7] and probably on settlement too. On the borders of Dartmoor, it may be that British conditions persisted until the coming of the Saxons, which perhaps in a district like Challacombe occurred quite late. The earliest records of

[6] 'Ancient Cultivations at Housesteads, Northumberland', Antiquity, 1931, V, 353. Hedley's conclusions have been challenged, and different periods have been suggested by W. A. Eden, 'The Housesteads Terraces', *Annals of Archaeology and Anthropology*, Dec. 1937, XXIV, 156.

[7] *The Place-Names of Devon.* English Place-Name Society, 1931, VIII, introduction.

two places situated close to systems of lynchets are 1238 for Blackaton Manor[8] and 1481 for Challacombe.[9] However, as yet it is not clear that one can postulate the same process as Hedley found, and the periods concerned are most probably different.

Field-Walls

These are of many types and in all stages of decay. Nevertheless, it is important to distinguish two principal types :—

(a) Ordinary ' dry ' walls, typical of Dartmoor, in good repair. Usually these enclose fields which are, or have been quite recently, under cultivation, but some are part of the wall system which encloses the terraced fields on the side of the valley opposite Challacombe farm.

(b) Broken down walls, some of which have been described as separating sets of terraces, as in fields F and G.

A Circular Field

This is now cut in two by the Widecombe-Challacombe road, but on an old estate map at Challacombe farm the two portions are treated as one field, of which the acreage is 1.867. Its traditional names, according to the oldest inhabitant at Challacombe, is ' Bury ' or ' Berry ' and it may have been a pound (compare ' Berry Pound[10]) near the site of the old farmhouse. On the eastern side, however, there is an alignment of standing stones inside the wall, and the space between the stones and the wall is a kind of platform. Most of the wall seems to be quite old.

Dwellings

(a) Two contiguous hut-circles are on the two top terraces, (one on each) at B. These circles are not recorded on the O.S. maps. They measure 11 yards in diameter, have very strong walling (see PLATE IV, 3), and an entry marked by an upright is very well marked in the upper one. It is most important that excavation should be attempted in order to ascertain whether these hut-circles are contemporary with the terraces on which they are situated, or whether the makers of the terraces

[8] ibid. p. 529.

[9] ibid. p. 481.

[10] To the east of Hamel Down. On Dartmoor and its borders, and in other parts of Devon, there are examples of circular pounds and many fields, of various shapes and sizes, called ' Bury ' or ' Berry '.

found it easier to incorporate them on account of the difficulty of destroying such strongly built dwellings. Little can be said as yet save that most of the hut-circles excavated on Dartmoor are pre-Roman, but that must not be used to support an argument that the terraces are too.

(b) Two hut-circles, recorded on O.S. maps, just outside the parish boundary, at M.

(c) A number of hut-circles, recorded on O.S. maps, outside the parish boundary, at N.

(d) A ' protected passage-way ', which some think is a tin-working, leading on to a roughly circular platform, site O. The platform is not ' protected ' on the west side, where it leads on to the three terraces, and may have been a dwelling of some kind, though no parallel example has been brought to the writer's notice.

A further season will, it is hoped, help to establish the ages of the fields and dwellings which have been described, as well as of the other series of terraces near Blackaton, to elucidate the relationship between all these important features, and to compare them with finds in other areas.[11]

My best thanks are expressed to Col. Ransom Pickard, and to Mr A. G. Clook for all the help which they have so kindly given me, especially in the photography and measurement.

[11] e.g. The lynchets discussed by E. C. Curwen in 'Ancient Cultivations', ANTIQUITY, 1932, VI, 389.

A Fossil Skull of an Ancestral Bushman from the Anglo-Egyptian Sudan

by Sir Arthur Smith Woodward, f.r.s.

IT is now recognized that during the Pleistocene, or even during a later prehistoric period, there were in northern Africa human races related to the existing Bushmen and the Hottentots of the south. The shape of the skull in some of the early Egyptians, indeed, suggests relationship to the Bushmen. The discovery in the Anglo–Egyptian Sudan of a new type of fossil human skull with several resemblances to that of a Bushman, is therefore of great interest. The specimen was found in February 1924 by Mr W. R. G. Bond, who was then Governor of the Fung Province of the Anglo–Egyptian Sudan. It was embedded in a limestone concretion, which lay a few feet above low-stage river level on the foreshore of the Blue Nile at Singa about 200 miles south of Khartoum. I have to thank Mr G. W. Grabham, then Government Geologist, for the opportunity of studying the fossil.

The skull (PLATES I-III) is still partly embedded in the hard matrix, but it has been cleaned enough to exhibit its principal characters. It lacks only the face below the orbits and the zygomatic arch of the right side, but its base is obscured by rock which probably cannot be removed. The walls of the brain cavity are also encrusted with a very hard deposit. The bone is completely mineralized and very well preserved, without much distortion by crushing. The maximum length of the skull is about 188 mm., and the maximum width 154 mm., so that the cephalic index is nearly 82. It is therefore just brachycephalic.

In upper view (PLATE I) the skull is pentagonoid in shape, widest at the comparatively large parietal bosses and very narrow at the anterior end of the frontal region. The zygomatic arches project considerably at the sides, and the lower ends of the nasal bones are visible in front. The coronal, sagittal, and lambdoid sutures are much serrated or zig-zagged ; and as the coronal suture is less conspicuous in the fossil than the sagittal, it is probably more nearly closed. The

frontal bones are completely fused together, and there is no trace of the metopic suture. They are much constricted to a width of 110 mm. in their narrowest part just behind the large external angular processes, where the maximum width is 128 mm. There is a gently rounded depression above the prominent supraorbital border which is a conspicuous feature of each orbit ; and the forehead is tumid, not retreating, above this anterior depression. There is a slight longitudinal median keel in the upper and hinder half of the frontal region ending at the bregma, and the frontal arc measures 128 mm. The parietal bones are remarkably large and broad, and rise at the sides into a pair of bosses at the beginning of the hinder third of the skull. In their anterior half, immediately behind the bregma, these bones are flattened ; but in their hinder half between the bosses, there is a well-marked longitudinal depression which ends at the lambda. Here the skull is fractured, and is seen to be 13 mm. thick at a distance of 50 mm. from the summit of the parietal boss. The parietal arc measures 103 mm.

In side view (PLATE II) the fulness of the frontal region is well seen, but the thickness of the supraorbital ridge appears a little exaggerated by a thin incrustation of mineral matter. Behind the bregma the flattening of the roof as far as the parietal bosses is evident ; and then there is a convex slope backwards which continues on the upper part of the occipital bone. This bone at the lambda is 7 mm. thick. When the skull is adjusted to a horizontal plane passing through the nasion and the middle of the auditory meatus (PLATE IV, 1), the auricular height is 115 mm. The ascending wing of the sphenoid is comparatively wide, and at its upper end it articulates with the parietal for an extent of about 20 mm. The squamous plate of the temporal bone, though a little broken at its upper border, is clearly very low, and the supramastoid ridge extending backwards from the zygomatic arch is prominent. This arch is incomplete and broken away in its lower portion forwards. The mastoid process as shown on the right side of the skull, seems to be unusually small. The limits both of the temporal muscle and of the temporal fascia are conspicuous on the parietal bone, and the line of the fascia is between 80 mm. and 90 mm. from the middle line of the skull in its nearest portion.

In back view, of which the lower half is still obscured by matrix, the flattening of the roof in the parietal region is well seen ; and the sides of the skull below the prominent bosses are shown to incline inwards to the base. These features are also observable in a cross-section of the skull at the parietal bosses (PLATE IV, 2). The longitudinal

interparietal depression clearly ends at the lambda without any trace of a continuation on the gently-convex occipital bone.

In front view (PLATE III), the relative narrowness of the frontal region is remarkable, and the slight longitudinal median keel in its upper and hinder part is conspicuous. The remains of the face suggest that it was short and broad. The thickening of the prominent supraorbital border is greatest mesially, but it is not continued into a ridge above the nasion. This thickening suggests that the skull belongs to a male individual. The plane of the glabella passes gradually downwards into that of the nasal bones, without any intervening depression, and no sutures are visible in this part of the fossil. The interorbital width is considerable, not less than 30 mm., and the nasal bones are noteworthy for their sharp bending upwards and forwards in their lower half. The large orbit, as shown on the left side, must have been wider than high, about 44 mm. in width and 38 mm. in height; its upper outer angle is nearly a right angle. The anterior end of the zygomatic arch is unfortunately too much broken to exhibit its original shape.

Although the skull is shorter and wider than the ordinary skulls of Bushmen, its proportions are not very different from those of a few exceptional examples (PLATES V–VII). It resembles the Bushman in (1) the fulness of the frontal region, and the slight longitudinal keel in its upper part; (2) the flattening of the middle part of the cranial roof; and (3) the prominence of the large parietal bosses, and the median longitudinal depression between these bosses. It also agrees in (4) the wide quadrangular shape of the orbit; (5) the low elevation of the squamous part of the temporal bone; and (6) apparently in the small size of the mastoid process. It differs chiefly in the greater prominence of the supraorbital ridges, and in the forward curvature of the nasal bones, which indicate a less shortened facial region. It may, indeed, be regarded as belonging to an ancestral Bushman in which the face was not yet shrunken.

The new specimen differs from all human skulls hitherto described as found fossil in north Africa, but it seems to resemble a little some skulls in the varied collection made by Dr C. Arambourg from an Upper Palaeolithic deposit in the rock-shelter of Afalou-bou-Rhummel on the coast of the Gulf of Bougie in northern Algeria.[1] It agrees

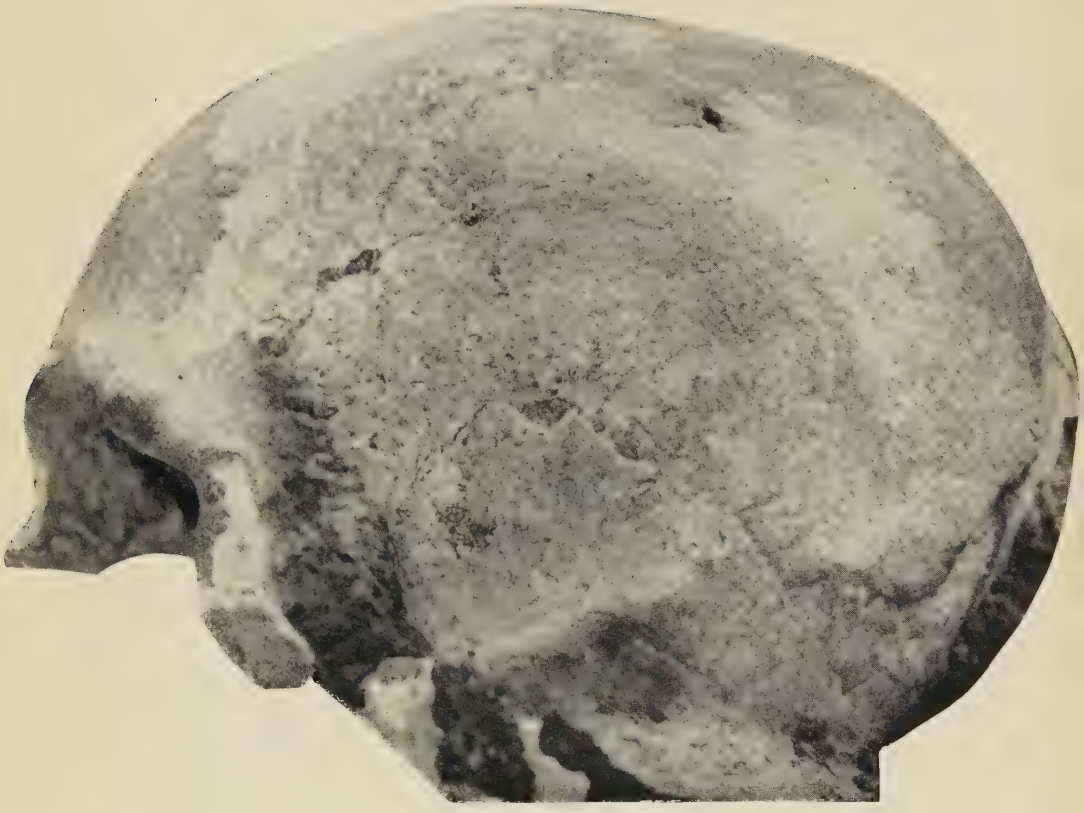
[1] M. Boule and H. Vallois, 'L'Homme fossile d'Asselar (Sahara)', Archives Inst. Paléont. Humaine, Paris, Mém. 9, 1932. C. Arambourg, M. Boule, H. Vallois, and R. Verneau, 'Les Grottes Paléolithiques des Beni-Segoual (Algérie)', *loc. cit.*, Mém. 13, 1934.

PLATE I

FOSSIL HUMAN SKULL FROM SINGA, SUDAN
Upper view, nearly on the Frankfurt plane; about five-sevenths natural size

facing p. 192

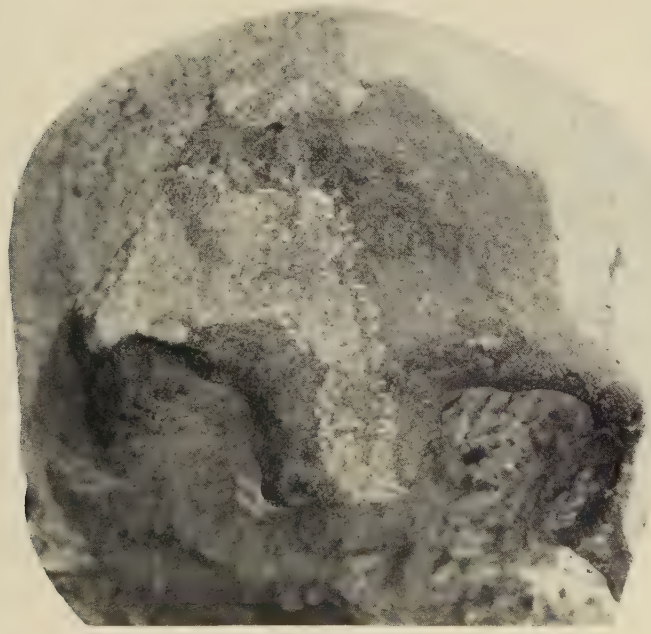
PLATE II



FOSSIL HUMAN SKULL FROM SINGA, SUDAN

Left side view, nearly on the Frankfurt plane ; about five-sevenths natural size

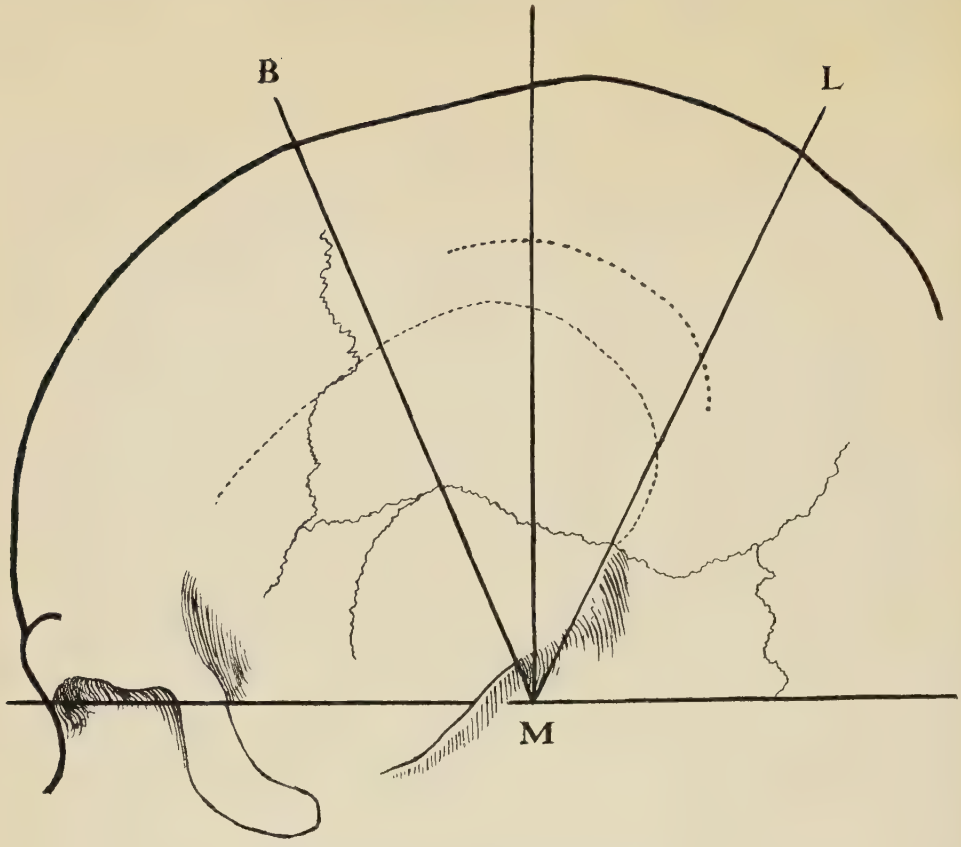
PLATE III



FOSSIL HUMAN SKULL FROM SINGA, SUDAN

Front view, nearly on the Frankfurt plane ; about five-sevenths natural size

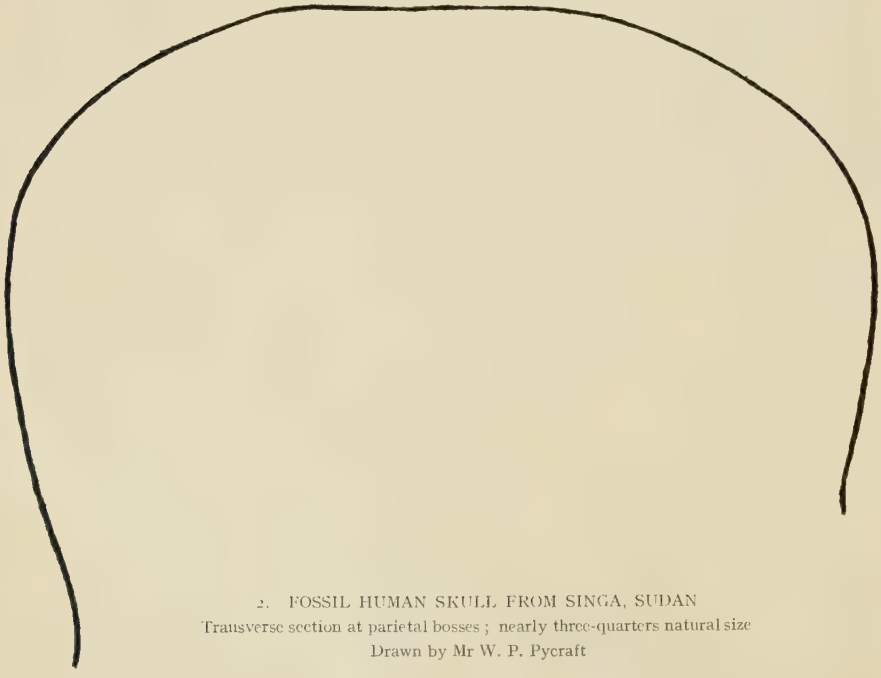
PLATE IV



1. FOSSIL HUMAN SKULL FROM SINGA, SUDAN

Diagram of side view based on the nasion-meatus line ; nearly five-sevenths natural size.
B, bregma ; L, lambda ; M, meatus

Drawn by Mr W. P. Pycraft

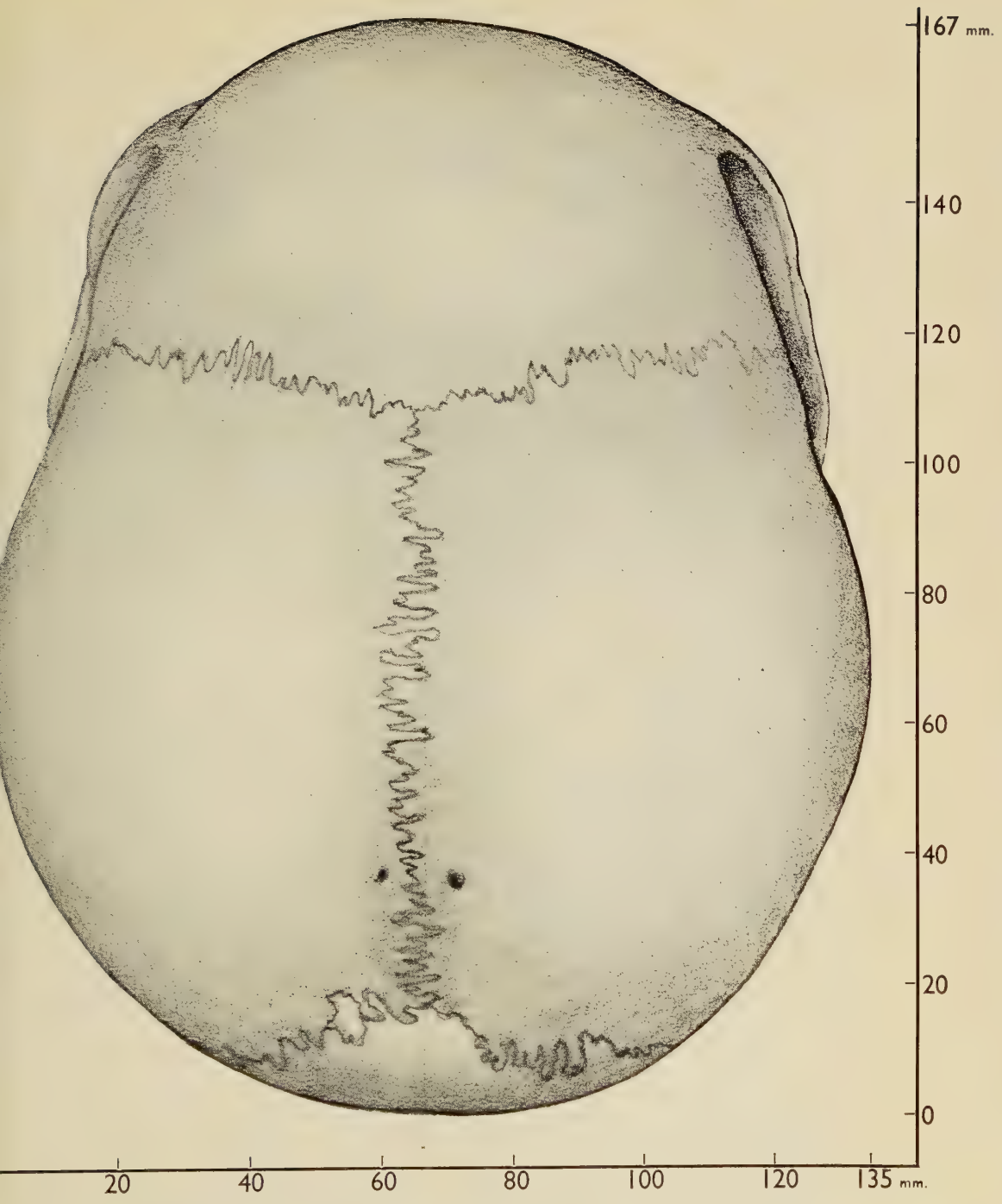


2. FOSSIL HUMAN SKULL FROM SINGA, SUDAN

Transverse section at parietal bosses ; nearly three-quarters natural size

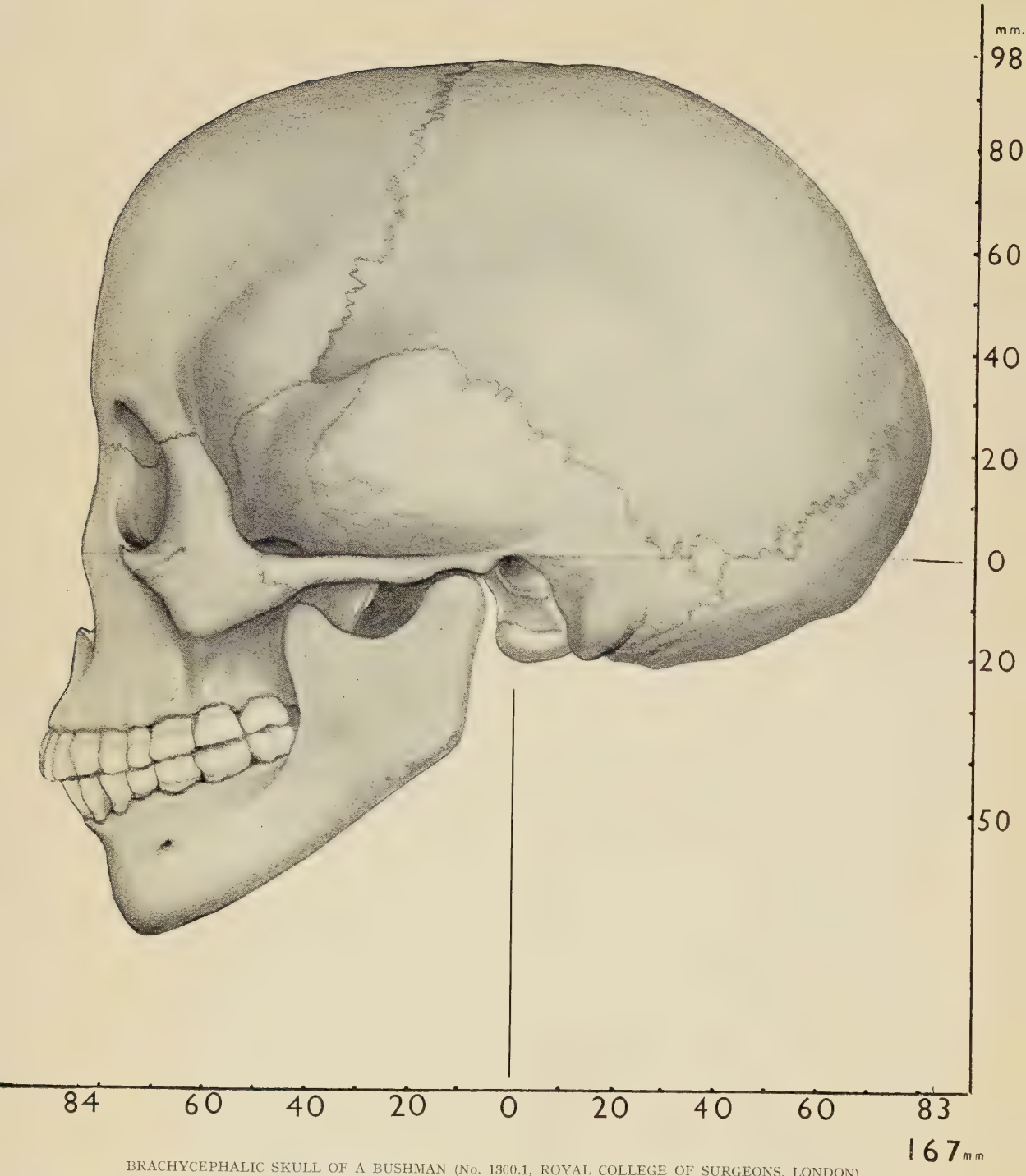
Drawn by Mr W. P. Pycraft

PLATE V



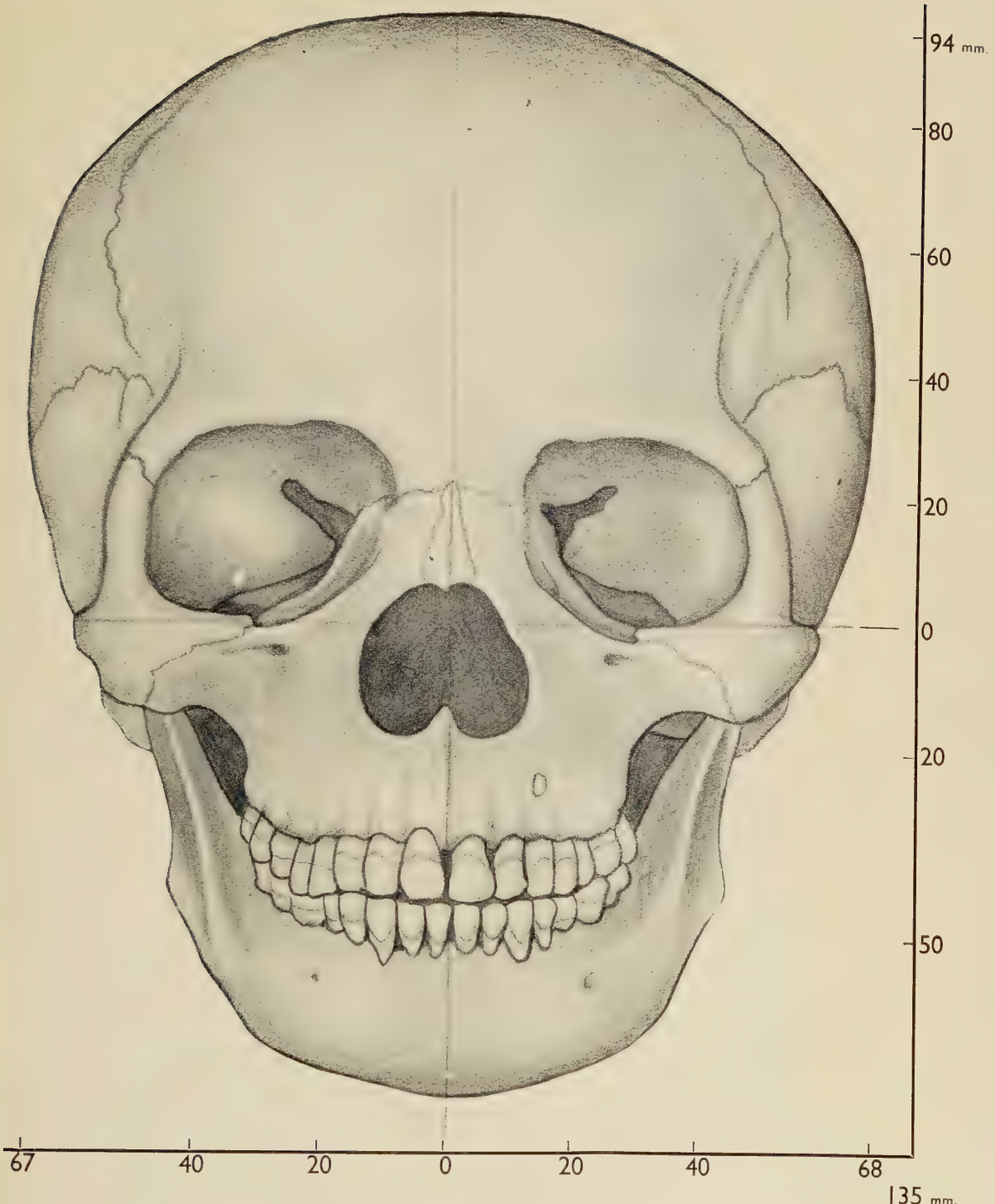
BRACHYCEPHALIC SKULL OF A BUSHMAN (No. 1300.1, ROYAL COLLEGE OF SURGEONS, LONDON)
Dioptographic drawing by Dr A. J. E. Cave, in upper view
By permission of the Royal College of Surgeons

PLATE VI



BRACHYCEPHALIC SKULL OF A BUSHMAN (No. 1300.1, ROYAL COLLEGE OF SURGEONS, LONDON)
Dioptographic drawing by Dr A. J. E. Cave, side view, on the Frankfurt plane
By permission of the Royal College of Surgeons

PLATE VII



BRACHYCEPHALIC SKULL OF A BUSHMAN (No. 1300.1, ROYAL COLLEGE OF SURGEONS, LONDON)
Dioptographic drawing by Dr A. J. E. Cave, front view, on the Frankfurt plane
By permission of the Royal College of Surgeons

especially with no. 12 of this collection in its pentagonoid form, with an interparietal depression, prominent supraorbital ridges, and wide quadrangular orbits ; but it differs in being brachycephalic instead of mesocephalic, in having a less retreating forehead, no marked depression below the glabella at the upper end of the nasal bones, and relatively small mastoid processes.

It is interesting to observe that in its most important features, the Sudan fossil agrees still more closely with the fossil Boskop skull which was found in 1913 in the Transvaal, South Africa.[2] Its calvaria, indeed, may be described as a brachycephalic variant of the Boskop type. The ancestors of the Bushmen, or Proto-Bushmen as they have been termed, were therefore distributed very widely in Africa from the north to the south, and they formed a vigorous race of normal bodily proportions. The modern Bushmen, of smaller size, with a reduced face completely beneath the protuberant brain-case, are degenerate survivors who have retreated to a comparatively small area where the circumstances of life are difficult.

Note on the Geology of the Singa District of the Blue Nile

by G. W. Grabham

Geological Adviser in the Anglo-Egyptian Sudan

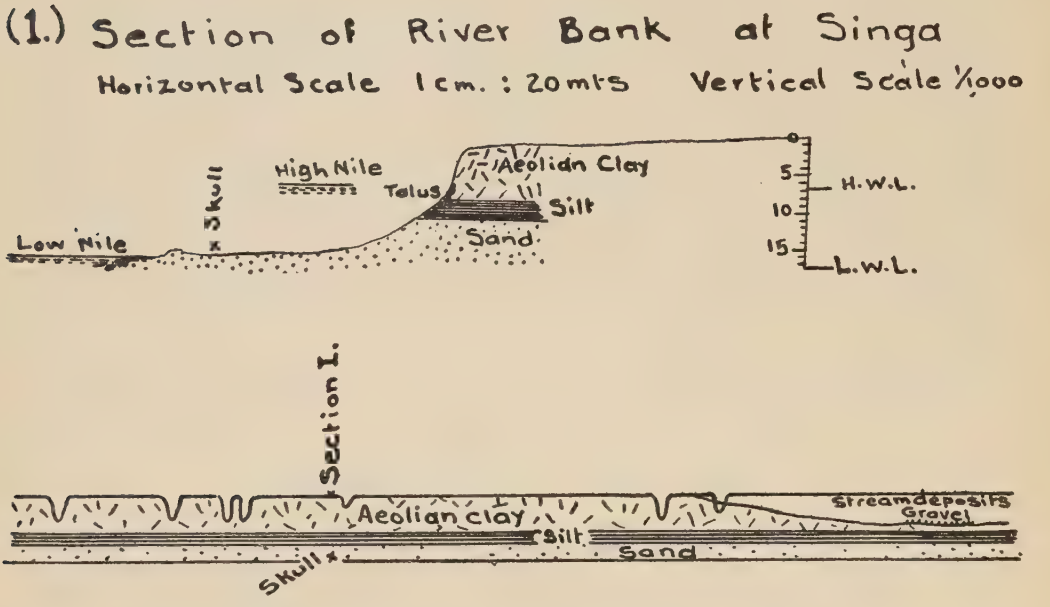
The Blue Nile south of Khartoum traverses a plain formed of wind-deposited clay whence the dark cracked cotton soil of the Gezira plain has been derived. This clay often rests on earlier river deposits, so there is evidence of an interruption in the flow of the river. At Singa, where the fossil human skull was found, the Blue Nile has cut a new valley through these deposits, exposing them as almost vertical cliffs or steep slopes behind banks of recently formed alluvium (p. 194).

The sequence of deposits is :—

1 Modern Nile river deposits
2 Local stream beds
3 Younger or upper wind-borne clay
4 Older river deposits
5 Older or lower clay

[2] S. H. Haughton, ' Preliminary Note on the ancient Human Skull-remains from the Transvaal ', *Trans. Roy. Soc. South Africa*, 1917, VI, 1. W. P. Pycraft, ' On the Calvaria found at Boskop, Transvaal, in 1913 ', *Journ. Roy. Anthrop. Inst.*, 1925, LV, 179.

The wind-borne clay (3) contains fine-grained concretions of carbonate of lime which are larger as the depth increases. Concretions of calcium carbonate have also been formed in the older alluvial sands and silts (4), each characteristic of the deposits in which they have been formed. In the sand they are root- or branch-like, while in the silt they are round or oval in shape and incorporate silt. Besides the



concretions which have been formed *in situ* the older river-deposits contain layers of concretions of a fine-grained type evidently derived from an earlier clay (5) which is not exposed. The current having washed away the clay and silt, the bed of the river seen at low stage is lined with a layer of the less easily moved concretions and conglomerate masses. It was among these that the fossil human skull was discovered embedded in a conglomerate of the fine-grained type of lime nodule. Though one cannot point out the position whence the mass containing the skull was derived, it probably had not moved

far. Moreover there is a horizon about two or three metres below the top of the older river deposits (4) with other bones similarly mineralized and associated with the same kind of conglomerate. There can be little doubt that the skull was contained in this horizon, but as with the bones we cannot say whether it belongs to the time when the deposit was formed or whether, like the limestone concretions, the skull and the other bones have been derived from an earlier deposit. Hippopotamus, buffalo and a siluroid fish are represented among the bones, but they do not permit the geological age to be determined. The skull cannot be younger than the older river deposits (4) and may have been derived from yet older deposits. The younger or upper wind-borne clay (3) covering the older river deposits probably represents a considerable period of time. While at present I have no basis on which to estimate the date at which the Nile as we know it began to flow, yet I venture the opinion that the historic times of Egypt, say about 5000 years, cover a considerable part of this interval and that the total may not exceed double this period.

The Simian Basis of Human Mechanics or Ape to Engineer*

by Earnest A. Hooton

Peabody Museum, Harvard University

MY subject should not be construed by the refined as a malicious innuendo, nor by the vulgar (unrepresented here, of course) as a ' dirty dig '. The transition from ape to engineer is from the ridiculous to the sublime—or, at any rate, from a little short of one to a little short of the other. This handsome statement must serve as my panegyric on mechanical science. As an anthropologist, I am perturbed by the fact that human invention has outstripped man's organic development, and his control of nature his control of himself. So I propose to discuss the organic basis of mechanical achievement and the cause of man's physical and social lag in relation to his material progress.

The Anatomical Antecedents of the Cultured Animal

Man is the only cultured animal, and human culture is but the product of a superior animal organism. We must examine the paradox of a living being which creates inanimate things more powerful and more nearly perfect than itself, with potentialities either for the salvation or the destruction of the inventor. The human organism is no up-to-date machine. It is like a horseless buggy which has undergone a series of reconstructions. The tires are flat ; the body is battered and obsolete, however much paint may be smeared on the radiator ; but the engine still runs and the machine still advances, as long as the steering gear works. Abandoning this simile, which is only a sort of sop to engineers, I will recall the successive stages of human evolution, beginning with the lowest members of our primate order, who were already in existence some sixty millions of years ago. First we have a long-snouted, small-brained, tree-dwelling quadruped, about as large as a squirrel, equipped with five flat-nailed digits on hands and feet, of which the innermost—thumb or great-toe—can grip one side of a bough, while the outer four digits grip the other. This is the lemuroid stage. Next we have another small animal which sits erect in the trees, having specialized its hind limbs for

* The Tenth Henry Robinson Towne Lecture. Delivered at the Annual Meeting, New York, N.Y., Dec. 6–10, 1937, of the American Society of Mechanical Engineers. Reprinted from *Mechanical Engineering* (New York City) for January, 1938, by the kind permission of the Editor and of Professor Hooton.

support and for hopping, while its grasping hands are used to feed itself and explore its surroundings. This beast has a shrunken snout with eyes which are moving from the sides of the face to the front, so that both can focus at the same time upon an object being carried to the mouth. The brain is larger and the head, with its shorter muzzle, is less ill-balanced upon the end of the upright spine. This is the tarsioid stage.

Next we have a considerably larger animal, with hands capable of encircling thicker boughs, which tends increasingly to move by swinging from one hand hold to another, the body suspended by the arms, and the legs trailing. The snout has continued to recede ; the eyes are completely frontal, and stereoscopic vision, which gives depth and perspective, has arrived. There is the rudiment of a brow and the tail has shrunk to a vestige. The ears are no longer erect, mobile, and pointed, but crumpled to the sides of the head ; the viscera are hitched up with sheets of membrane to keep them from sagging when the trunk is vertical. I have described a telescoped, super-monkey, sub-ape stage of primary evolution. Next this animal, having become too large, too hungry, or too smart for life in the trees, takes a chance on the ground. In order to see the better and to have its hands free for fighting and feeding, it rears up and stands upon its unsteady legs. The flexible, prehensile feet gradually become strengthened to bear the weight of the body ; the lesser toes shorten and the great toe loses its thumb-like mobility so that the foot can no longer grasp. The legs become longer and more powerful ; the pelvic girdle expanded and flattened as a transmitter of total body weight and a framework for attachment of the great muscles used in standing and walking. The spine gets a forward kink above the pelvis which serves to erect the trunk ; the tail remnant has sunk beneath the buttocks and forms a part of the pelvic floor ; the chest has been flattened from front to back by altered gravitational pull ; the arms have become shorter and the hand refined from locomotive duties ; the tip of the thumb can now be opposed delicately to the tips of the outer fingers. The teeth have become so reduced that the lips are outrolled ; the bony nose with its fleshy tip has grown and bloomed ; the eyes, formerly recessed under a jutting bony shelf, now peer from beneath the base of an incipient dome ; the brain case has exceeded the size of a grapefruit and now resembles an overgrown cantaloupe. This nearly human animal is all ready to contrive tools and to use them, thus beginning a career as master mechanic of the animal kingdom, which makes him, perhaps, in the course of a million years, a member of the American Society of Mechanical Engineers.

All of the items of organic equipment which have enabled man to produce the marvels of mechanics are a part of his primate inheritance. The first are the sensitive mobile hands with their opposable thumbs. The grasping extremities, hands and feet, with their five digits, are an ancient vertebrate character, observable in a crude form in some reptiles. In the little lemurs the great diameter of average tree branches, relative to the size of the prehensile hands and feet, forces them to plaster the palms and soles tight against the bough, with the inner digits directed at an angle of almost 180 degrees with the outer four. Often the index finger is reduced to a stump. There is little development of manipulative skill in the users of this clinging or perching grasp. When primate animals of larger size develop, the rotation of the thumb and its opposability to the finger tips begin to come into tactile and exploratory use. In the larger monkeys and apes the hands are big enough to permit a large and heavy object to be held in one, while the animal tears at it with the other or with its teeth. But the tree animal has to sit up to have its hands free for feeding, fighting, or other purposes. Having to sit up or down in order to use your hands is not conducive to two-handed experimentation or to the making of tools, when you are perched precariously in a tree. A sitting monkey usually holds on with both feet and one hand, and has but one free prehensile member, unless equipped with a grasping tail. On the ground some macaques and baboons may stand on three extremities and pick up objects with the free hand, but whether in arboreal or terrestrial life, one free hand is not enough.

Sitting up develops balance and encourages the animal to use its eyes rather than its nose. It takes the eyes off the ground and enlarges the range of vision. No mechanical achievement springs from developing the primitive sense of smell. On the other hand, acuity of vision, the ability to judge distances accurately and to record impressions of form, to remark relations and generally to observe, are primary requisites for an animal which is to become a mechanic. It is at this point, possibly, that the brain begins to step in and play a preponderant role in the coordination between the eyes and the hands which ultimately results in the creation of a material culture. Next to the sensory and motor areas of the nervous covering of the brain, there grow up regions in which movements are pictured, and beyond them, probably, those mysterious brain tracts which provide for association, memory, and creative thinking.

But no animal up a tree can initiate a culture. The realization of the possibilities of stereoscopic vision, emancipated hands, and an elaborate nervous organization had to await the descent to the ground.

In arboreal life the animal must ever contend against gravitation, be on the alert to maintain his balance. He has no firm footing. Our ancestors, wisely or fortunately, descended from the trees and eventually stood upon their feet on the ground. The stabilized supporting foot is nearly as essential for tool producing as are the free hands with their opposable thumbs. For no effective use of tools or weapons would have been possible for an animal which suspended itself by the arms from the trees, or for one which stood and moved on the ground on all fours. It was quite as necessary that the foot be remade as that the hand preserve and perfect its primitively mobile digits. The adaptations undergone by the spine, the pelvis, the lower limbs, and the foot, enabled the animal to get his whole body into a single vertical axis and to poise the centre of gravity over the bipedal base of support. This base of support could be widened or lengthened by shifting the feet, according to the exigencies of the ground surface, or the balance required by varied movements and positions of the arms and torso, in the carrying of weights, the wielding of tools or other manual activity. Moreover, the erect posture and biped gait, as a result of perfected arrangements of the bodily mechanics, soon became so effortless and so automatic, that the animal acquired the ability to walk or run while still employing the hands in unrelated and skilful movements. The locomotor and supporting appendages were emancipated from the prehensile members.

Thus it appears that before a primate can become an engineer he has to have a series of very complicated engineering jobs done upon him by a firm of biological engineers which we may call Variation, Adaptation, and Natural Selection, Unlimited.

Reflections of Prehuman Mechanics in Anthropoid Apes

A clearer understanding of the primate background of human mechanics may be gained from the study of the use of implements in monkeys and apes. Prof. Robert E. Yerkes, of Yale, an authority on primate behaviour, does not think that primates below the level of monkeys make any use of movable objects as tools or implements. There is no doubt that some monkeys display considerable dexterity in the handling of objects. However, Yerkes has known intimately only one monkey which he considered had an aptitude for the use of implements, and this gifted individual merely played with human tools. De Haan, however, experimented with an American monkey which, in the use of a variety of implements, was judged to be more intelligent than any anthropoid ape except the chimpanzee. Most of the experiments of

psychologists have as their object the testing of the intelligence of an animal, by setting it a problem which may or may not require for solution the manipulation of objects in a purposeful way. The use of tools is usually only incidental to the problem.

Experiments with the gibbon, the small anthropoid ape, seem to indicate no more mechanical ability on the part of that animal than is displayed by monkeys. Given a rake with which food may be secured, the animal will draw in the food if the latter is in front of the rake, but will not attempt to place the rake behind it for the purpose. Dr C. R. Carpenter states that the gibbon, which has very long fingers and a very short thumb, makes comparatively little use of the latter in handling food or other objects. The short thumb is pressed against one of the middle joints of the fingers rather than opposed to the tips, and instead of picking things up by gripping them directly between finger tips and thumb, the gibbon uses a sidewise scooping method.

On the whole, the gibbon is narrowly specialized for tree locomotion. Its arms are so long that they reach the ground when the animal stands erect. It swings by its arms from bough to bough and from tree to tree, easily clearing spaces of twenty feet. Although the great length of the upper limb is a mechanical advantage in moving the body weight by brachiation (arm-swinging), it is decidedly the reverse in the skilled handling of objects. Such long arms require too much elbow room, and the very extension of the forearm, which is the fixed lever in arm locomotion, interferes with quickness and precision of movements when the hanging upper limbs are flexed in lifting objects and the forearm becomes the movable part of the lever. But it is mainly deficiency of brain and not excess of arm which prevents the gibbon from being an engineer.

The orang-utan, a much larger and stronger animal, is also handicapped in tool using by excessively long arms and short thumbs. However, this ape is easily taught such high human accomplishments as eating sliced bananas with a fork, lighting a cigarette, riding a bicycle, driving nails, and selecting the right Yale key with which to unlock a box. One of Hornaday's orangs used the bar of his trapeze as a lever to enlarge the opening between the end bar of his cage and the concrete partition, so that he could get his head through and look into his neighbor's house. Thus curiosity is the father of invention. Often orangs twist the straw from the cage floor into ropes, and use them for swinging from trapeze bars. Yerkes set a problem for his orang-utan, Julius, in which the animal was supposed to pile up boxes beneath a banana suspended out of reach, so that he could climb the pile and get the fruit.

Julius was very slow in solving the problem with boxes, but when given a pole, he improvised a perch between the corner bars of the cage, and reached the banana by swinging or leaping from the perch. If I understand Yerkes correctly, Julius also got the banana by pole-vaulting for it. His brightest achievement, not mechanical, was to coax Professor Yerkes to stand under the banana so that the ape could climb the professorial ladder. Julius could not learn to unlock a padlock with a key, perhaps because he belonged to the period of Yerkes' sojourn at Harvard, so that he was not allowed to use a Yale key. Yerkes thinks that, on the whole, the orang-utan is not mechanically gifted, although more intelligent and adaptable in the use of tools than the gibbon. Nevertheless, the orang is apparently profoundly uninterested in engineering.

The chimpanzee, a much more tractable and sociable animal, is the favourite ape for experiments, and the most accomplished and inventive in the field of tool-using. Köhler has pointed out that certain defects in the chimpanzee's perceptions interfere with his mechanical progress. He does not distinguish between a part and the whole if they are spatially connected. If a table is placed in the corner of the room, so that its surface appears to be joined to the walls, the chimpanzee will pass it by in his search for a movable object. He generally fails also to distinguish between a cord which is tied to a basket of food outside of the cage, by which the prize may be drawn within reach, and a cord which merely touches the basket. The odds are even that he will pull the wrong string.

Köhler also finds that the chimpanzees have little idea of statics. They cannot learn to make a stable pile of boxes. A large box will be placed precariously on top of a smaller one, and the animal standing on the summit of the shaky pile may even attempt to pull out one of the bottom boxes to add it to the top. The chimpanzee will attempt to stand a ladder vertically under a suspended object and climb up. If the object is hung close to the wall of the room, the chimpanzee will set the ladder flat against the wall, or edge against the wall. The animal's understanding of statics is impeded, and at the same time compensated by its own organic statics—*i.e.*, those of its labyrinth and cerebellum. For the chimpanzee is a natural equilibrist. When he piles up a wobbly and unbalanced structure of boxes, which will topple over if left to itself, he often succeeds in mounting it and balancing it by his own weight long enough to enable him to grab the banana. Again, he is able to set the ladder flat against the wall and climb up it before it falls or even hold it vertically in the middle of the cage, run up it, seize the prize, and jump.

In other words, he accomplishes a physiological achievement without a mechanical solution. Nevertheless, these animals do not have an absolute lack of insight into statics : they do not try to suspend a box in thin air, and when they use a pole as a jumping stick from the top of a box, they do not attempt to rest the end *in vacuo*, but on the box—although perhaps on its very edge. Köhler thinks that visual orientation in space, the fixed idea of ' above ' and ' below ', develops gradually in human children as a result of the habitual upright posture of the head, whereas in a chimpanzee the head is just as likely to be held upside-down, and lack of such firm orientation inhibits the development of statics. The chimpanzee lacks the incentive for the development of statics because of his natural gifts as an equilibrist.[1]

The one gorilla investigated by Yerkes, a young female named Congo, in tackling the problems of utilizing poles, boxes, et cetera, showed a high degree of ineptitude. In fact, Yerkes calls her a ' moron in mechanics ', but notes that this kind of moron may be capable, nevertheless, of various kinds of imaginative adaptation.[2] I gather that he is of the opinion that such mechanical morons may be accidents which happen even in the best of families—the Hominidae—and especially in the females.

The question of handedness, footedness, and eyedness in the anthropoid apes has been insufficiently investigated. The preference for the use of one foot, one eye, and one hand, and the involved specialization of the controlling side of the brain is of enormous importance in man's mechanical achievement. But even in human beings the implications of bilateral asymmetry and specialization are little understood. Only comparatively recently, educational psychology has discovered the serious extent to which children who are not right-eyed and right-handed, nor yet left-eyed and left-handed, but unspecialized, are handicapped in most human learning processes. Yerkes thinks that preferential use of the members of one side occurs frequently in the anthropoid apes, but does not commit himself to positive statements as to handedness and eyedness in the different apes. But it is fairly clear that an animal has to decide which hand to use before he can accomplish any mechanical feat with either.

Certainly the lack of speech is an insurmountable obstacle to the transmission of culture in the ape. When each individual has to discover

[1] *The Mentality of Apes*, by Köhler, pp. 139–172, N.Y., 1925.

[2] *The Great Apes*, by Robert M. Yerkes and Ada W. Yerkes, p. 513, New Haven, 1929.

for himself, or to learn only by exemplification, there can be little or no diffusion of the inventions of the mechanical mind to the ungifted who are capable only of utilization. In the last analysis, however, there is but one fundamental reason for man's exclusive possession of a material culture, for his unique understanding and application of the laws of mechanics. Man has a more highly evolved central nervous system than any other animal. The primitive insectivore with an infinitesimally better brain than its kind takes to tree life. The tarsier, with a slightly superior nervous endowment, sits up and begins to emancipate its hands. The more elaborate cerebral cortex of the monkey expends its excess of nervous or electrical energy in an aimless curiosity. This becomes more purposeful in the bigger brained anthropoid apes and not only adapts the organism but invests it with the quality probably shared only with man—insight. The brain begins to get the upper hand of the body. Even in the earliest of fossil men, this cerebral dominance has so far subordinated gross physical equipment of powerful jaws, big teeth, and strong grasping extremities, that these no longer require modification to enable the animal to survive. The earliest human forms we know were tool-users. When man becomes an engineer he begins to adapt his environment to himself, rather than himself to his environment. Tools make organic adaptation obsolete.

Steps in Man's Mechanical Progress

I have been dealing with the physical and psychological background of man's mechanical preeminence. But progress in any science presupposes a society in which competition stimulates the inventive brain, while mutual aid and imitation amplify and improve its achievements. Let us examine the social basis of man's engineering progress. Perpetuation of the species is secured by success in the food quest, by evasion of, or defence against, enemies, and by reproduction with the safeguarding of offspring. At the root- and fruit-collecting and hunting stage of man's existence there is a certain incompatibility between the food quest and social aggregation. To live upon natural products it is desirable that human groupings be small and widely scattered. For purposes of mutual defence it is, on the other hand, essential that bands of numerous families be formed, if we assume, as I think we must, that the earliest forms of men had already sacrificed muscular strength and organic defensive ability to high development of the nervous system The great anthropoid apes are powerful enough to fend for themselves in scattered family groups, and at worst they can take to the trees. Man,

in becoming a terrestrial biped, incurred great risks because of his slow locomotion and his puny strength. It seems probable that the necessity which first mothered invention was that of devising weapons to eke out the inadequate strength of the lone food-collector. As soon as the contrivance of weapons of wood and stone had supplemented man's organic resources so that he could tackle the larger game animals and become a carnivore, large social groups became feasible and advantageous. For really big animals can best be hunted down and killed by groups, rather than by individuals, and even if you can kill an elephant single-handed, you and your family cannot eat it by yourselves before its flesh becomes too 'high' even for savage consumption. The antiquity of human combination into social groups is shown by the hundreds of thousands of stone implements of almost identical types which are found in widely separated parts of the Old World during the glacial epoch. Already manifold types of stone implements existed, adapted for various uses. Imitation and diffusion of mechanical achievements had begun. The use of the lever is prehuman ; stone working is at least one million years old ; the utilization of fire nearly as ancient, although its first artificial production cannot be dated. The harpoon and the spear are easily thirty thousand years old, as are also the spear thrower and the sewing needle ; pottery and the bow may not be more than half of that age.

The domestication of plants and animals, which probably began eight to ten thousands of years ago, furnished the greatest incentive to mechanical progress. Domestication enabled man to get an adequate command of food supply, to settle down, to construct permanent abodes, and to begin the division of labour whereby the craftsman bartered the products of his skill for food. The training of the ox and the horse to perform the tasks previously accomplished by man-power enormously increased the amount of energy available for work production. All of this is elementary and obvious.

Etiology of Mechanical Progress

I should like to discuss briefly here, however, the respective roles of the individual inventive genius and of the imitative crowd in the furthering of mechanical science in primitive society.

Possibly the outstanding characteristic of primitive or savage societies is their rock-ribbed conservatism. That is perhaps why many of them have remained primitive. Under these circumstances the progressive has hard sledding. People persist in doing things in the old

stupid ways and in using implements which are ineffective and obsolete, merely because of the ease with which motor habits are formed and the impermeability of the low-grade brain to new ideas. The innovator in the field of mechanical science is regarded with suspicion, fear, and hatred, because his inventions are misunderstood, and because they seem to give him an unfair advantage and to depreciate the time-honoured methods, inferior tools, and lesser ingenuity of the ordinary worker. These observations are valid in primitive societies and probably held true in civilized nations up to the last century. Only within that time have innovations become the rage of industrialization. The primitive inventor had to overcome a far greater inertia of stupidity and conservatism than it is easy for us in our mechanical age to conceive. He had to possess not only the mental ability to formulate mechanical principles and to translate them into working models, but also the moral courage to persist in the contrivance and use of the novelties which made him suspect.

The almost incredible duration, through scores of thousands of years, of identical types of coarsely shaped and inefficient flint implements, probably reflects the struggle of the human organism to accustom itself to extraorganic aids. It suggests even more forcibly the suppression of the gifted innovator by the unprogressive horde. It is almost treasonable to argue in this democratic society that social, material, and intellectual progress has never been a communal achievement—a sort of immaculate conception of the group mind—but always the result of the effort of the gifted individual. The genius, mechanical or of any other sort, seems to be due to a fortuitous combination of superior mental qualities which from time to time is dealt from the shuffled pack of hereditary units. Civilization has advanced, in my opinion, not because of any improvement of mental quality in the masses within the last ten thousand years, but rather because the realization of the material advantages to be gained from the toleration of genius has slowly percolated into the torpid minds of the majority of our species. This very reluctance to adopt a new and better idea or device carries with it a tenacity in the retention of such material cultural improvements as have won acceptance. Consequently, little utilitarian mechanical knowledge is lost, and there is a slow, cumulative transmission of the scientific achievements of the past. Thus when the rare genius comes along, he is enabled in successive ages to take off his flight from higher structures which have been painfully built up by his gifted predecessors, consolidated by subsequent utilization, and sanctified by custom.

Effect of Tool-using upon the Organism and upon Society

Let us now consider the effects of tool-using in a complex society upon man's organism and his biological future. There can be no doubt that modern mechanical science is partly responsible for the diversion of human evolution into smoothly engineered highways upon which we are coasting recklessly downhill. Let me recapitulate for a moment. Man raised himself above the level of the brute ape by developing a superior brain which enabled him to bolster his physical weakness by the use of extraorganic tools. A succession of achievements along this line very quickly made him monarch of all he surveyed—lord of the fowl and the brute. Unsatisfied with dominance of animate nature, he has proceeded, with some success, to attempt to harness the forces of the universe. Why should any one carp at such a stupendous performance ? In the first place, I think that we may assume that any living organism, by its metabolic processes, can convert into vital energy, for growth, for reproduction, or for the performance of work, an amount of food which is rigidly limited by various organic restrictions. By means of hormones, or chemical messengers, the secretions of the ductless glands direct varying amounts of energy to different parts of the organism, according to the insistency of their several demands. The active part receives the nutriment it requires ; it enlarges. The idle organ is kept upon starvation diet and shrinks. The ascendant phase of human evolution emphasized cerebral development because the brain was actively functioning in order that the species might survive by mechanical progress. At the same time, this brain trust was robbing the rest of the body, but to some extent of ill-gotten gains accumulated during the brutish stages of higher primate development, when the giant anthropoid apes (including our ancestors) got the bulge upon the monkeys, simply by becoming gigantic, formidable, and fearless. The increasing use of the brain both directly diverted nutriment from other parts of the body, and indirectly, through creation of tools, diminished the work which had to be done by the hands, arms, legs, and teeth. These less active organs decreased in size, and atrophy brought also impairment of quality and not infrequent pathology. Up to a point, the recession in muscular strength and in masticatory and digestive ability was perfectly all right. No man has need of the strength of the ape (unless he is a professional wrestler or that supreme product of higher education—a football player). But he *ought* to need the brains of a man ; he should not be able to survive and to flourish with the mental equipment of a moron.

At first, mechanical science merely devised tools which would utilize more efficiently the supply of human energy convertible into work. Use of these tools required muscular exertion, manual skill and coordination, and a considerable mental effort. Thus a sort of organic equilibrium in evolution was maintained ; the brain was not overfed ; the body was not markedly atrophied. The mischief began when mechanical genius began to contrive tools which facilitated the performance of work with little or no cerebral exertion. In the conversion of raw products, the individual was allowed not only to stop sweating, but also to stop thinking. While he did work with tools requiring a minimum expenditure of physical energy, his brain went on a vacation.

The industrial age involves an elaborate social structure with a minute division of labor. The object of this organization is the mass production of material culture with the supposed purpose of furnishing cheaply to most of mankind things which will make life easier and happier. The ideal of popular distribution of invented products has, to a great extent, been realized. It is unnecessary to regurgitate here the well-masticated question of the social and biological effect upon human organisms of their being transformed into units for this mechanized production. The working days of these human cogs are spent in performing with precision and rapidity a short series of skilled movements which become more or less automatic, but still require attention. The effect of such a life upon the nervous system, upon the mind, and even upon the muscular and other functions of the body is devastating. Such an infinitesimal human unit in a production machine can scarcely realize from his labors that sense of creation and pride of craftsmanship which are the incentives that make the engineer.

The anthropological effect of mechanization upon the users of these super-tools is mainly maleficent. Primitive conditions require the individual to be physically and to some extent mentally active throughout his short span of life, if he is to survive and perpetuate his kind. Demands upon his organism are symmetrical, though rigorous. Natural selection and social selection eliminate the physically inferior, the manually inept, and to some extent the mentally dull, because each man creates his own tools and survives through his ability to use them. Intelligence advances in step with mechanical ability and bodily fitness. However, when human ingenuity contrives machines which increase almost infinitely the individuals' control over matter, the struggle for survival and the checks against population increase are largely nullified. The physically and mentally inferior multiply with astounding rapidity,

partly because their feeble capacities for productive work are, nevertheless, sufficient to make them cheap, but essential, adjuncts to the machines which play the larger part in goods production. Mechanical conversion of natural resources into food and other human essentials permits the survival of the low-grade biological specimen on a level of adequate nutrition and comparative idleness which would have been unimaginable for the primitive being, even if he were at once a mental genius and a Hercules. A majority of the population exists parasitically upon the inventive genius of the few, with little exercise of its meagre intelligence. The mechanical contrivances which eliminate the necessity of thought, judgment, and skill in the user are almost equally available for the use of the moron and the criminal as for the intelligent and the socially minded. The vast potentialities of these tools are used more and more for evil, as they become perfected, cheaper, and more easily accessible. Machines get better and better, while man gets worse and worse. The extra-organic tools are no longer accessories ; the tail now wags the dog and even thinks for him. It remains for the other end only to bark and bite.

The once erectly striding biped abandons human locomotion and whizzes through the landscape, crouched over wheels and levers worked by his still prehensile hands, and his flat, vestigial feet less useful for this purpose than those of his simian ancestors. He breathes a mixture of gasoline fumes and carbon monoxide and reeks of evolutionary decay. A premium is put upon illiteracy by the radio and the talking moving picture. These mechanical marvels are the means of world-wide spread of vulgarity, depravity, and misinformation, since they pander to the tastes of those who are capable neither of contriving nor understanding but only of crude sensory perception, stimulated by turning a switch or pressing a button—motor performances within the capacity of a lemur. Truly, man can say to the engineer, ' The zeal of thine house hath eaten me up '.

Now I have purposely painted a somewhat lurid picture, which may be thought a caricature, and is not likely to win admiration or to give pleasure. As a matter of fact I wish to do neither. When nearly all of mankind insists upon regarding themselves as godlike creatures, he who harps upon the apish basis of the human organism and the possible reversion to an apelike behaviour, cannot hope for popular acclaim. I do not wish to depreciate the virtually superhuman achievements of pure and applied science ; in fact I aspire to be regarded as a humble sort of scientist myself—possibly an impure practitioner of an

unapplied science. It is my purpose, rather, to emphasize the possibility that man's mechanical science (the product of the few) has so far outstripped his biological status and his social ideals and behaviour that it has become a menace. What are we to do about it—call a moratorium upon mechanical endeavour and progress until man catches up with his machines ? I think not.

What we must do is to divert a modicum of that high intelligence and creative ability which is too nearly monopolized by mechanical science to the study of ways and means of repairing and improving the human machine. We must remember that we are still animal organisms, and that the higher animal elevates himself only by striving to exercise to the full his organic functions. Degeneration and evolutionary extinction are the fate of the living thing which becomes so dependent upon a specialized environment that it loses the power of adaptation, of initiative, and of progress—literal and figurative. It is no more profitable for man to become a slave to the mechanical contrivances of his own mind (or of others' minds) than to become a parasite upon anything else in nature.

Man made himself out of an ape, partly by becoming an engineer. The danger now is that the process will be reversed and the engineers will make apes of all of us. We apes shall then destroy ourselves and hoist the engineer with his own petard. My firm conviction is that we must build the future of humanity, if there is to be any future, not upon mechanical science which is up to this point the greatest human achievement, but upon man's biology about which we know virtually nothing at all. If man can make machines which are better than himself, cannot he make himself better ? We do not need more automobiles, we need fewer fools in the driving seats ; we do not want mechanical robots, we want human animals who still have brains ; not more jails, but fewer criminals ; not perfected weapons of war, but peace. The gorilla can manipulate human tools, but he uses them destructively. There is but one way of making a man, and that is the biological way. There can be no stability of civilization, when the human biped totters, and he cannot be propped effectively by law, by education, by religion, or even by mechanical inventions. Breed better animals by selection and elimination of the inferior ; study the transmission of those organic capabilities stored up by our species through the millions of years of primate evolution which have culminated in man. You will then conclude that it is man who makes the tools, and that only men, not morons or apes, may use them for the betterment of humanity.

Mr Myres on Verulamium

by R. E. M. Wheeler

IN the last part of Antiquity (March 1938), Mr Nowell Myres has said certain things—many of them excessively handsome things—about the excavation of Verulamium, and in particular about the Report which was written three or four years ago and was published by the Society of Antiquaries two years ago. In his commentary there is much that he and I may allow to rest in our mutual understanding. But there is much else that claims no such sanctuary; and since he himself pleads guilty to the 'somewhat ungracious procedure' of having 'deliberately taken up not so much the positive achievements of the authors' work at Verulamium as what may be termed its negative results,' I am tempted for a few pages to share his guilt and his 'ungraciousness'—to deal, in short, with one or two matters which have escaped Mr Myres and must therefore have escaped other critics.

Mr Myres's main contention, that the work of excavation at Verulamium was left unfinished in 1934, is as true as it is obvious. By an astonishing coincidence—for neither Mr Myres nor I knew that the other was writing—a complete answer to this complaint was contributed by me to the *Antiquaries Journal* for April 1938. My own article was in page-proof before Mr Myres's appeared and, save for the addition of a postscript, has not been altered. In that article I briefly set forth a number of facts which, though they have been familiar to a widening circle of archaeologists since the end of 1930, had seemingly failed to penetrate the enviable seclusion of Tom Quad. Without again recounting all these facts, I may recall that, from the end of 1930 until the middle of 1937, the greater part of Belgic Verulamium (including a portion of Prae Wood) and the projecting part of the Early Roman city (the 'Fosse') were threatened by an impending 100-ft. arterial road, the exact line of which defied agreement between the various interests and authorities and could not yet therefore be anticipated by excavation. Conference succeeded conference throughout those years. First Commissioner after First Commissioner was initiated into the scheme by the Ancient Monuments Department; one First Commissioner

actually surveyed the battle-field in person. Hospitality and argument were lavished upon those whose word might count a *little* one way or another. Indeed, on a review of that exciting epoch I am driven to the conclusion that Mr Myres is the only person in Great Britain who was not rendered sleepless through intrigue and indigestion. But by now at least he fully understands the inwardness of our attitude towards those two vital parts of the Verulamium complex. So far from avoiding and evading them, we lived in daily contemplation of a £5,000 ' dig ' that should encompass both.

The environment of Mr Myres's criticism thus fades into nothingness, and Mr Myres himself would gallantly be the first to admit it. His further complaint that in the Report there is ' no discussion of prospects for the future ', is, however, cogent enough. In future my excavation-reports shall comprise two parts : Part I, what we did ; Part II, what we didn't. I speak seriously since, on looking again at the Verulamium Report, it is now clear to me that my cursory reference on p. 39 to the impending arterial road was insufficiently explicit to allay Mr Myres's potential fears. Mr Myres scores.

But Mr Myres does not always score. Indeed, I have a comfortable fear that in several matters he is less than right. Take, for example, his reference to Belgic Verulamium :

> ' Are we really to believe that this unimpressive group of earthworks in Prae Wood with its shadowy continuation to the south, with not a single identifiable hut-site and no intelligible western boundary was by itself the centre of Tasciovanus' power. . . ? Of two things at least we may be certain : his palace was not there and his mint was not there ; had they been, we can be sure that Dr Wheeler would have found them '.

Mr Myres, by way of contrast with this nebulosity, proceeds to cite Belgic Colchester as a ' good example ' of a Belgic city.

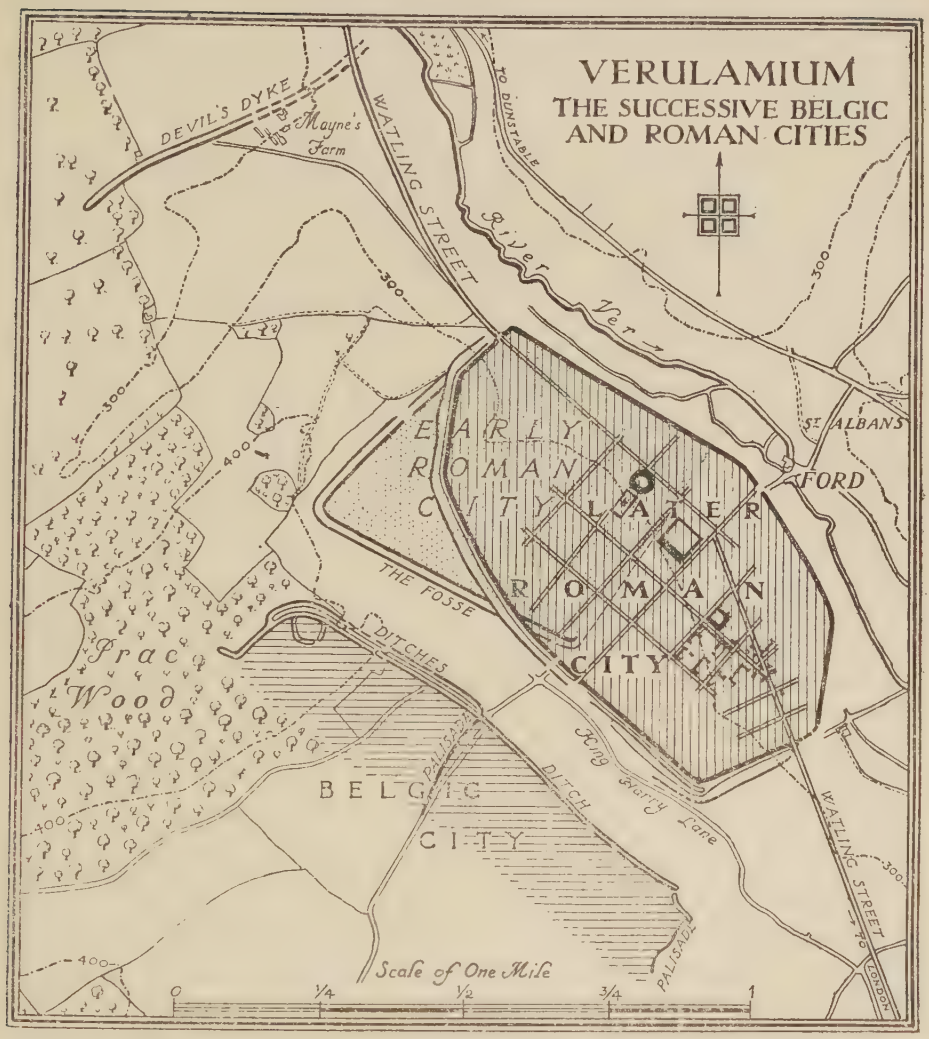
> ' This appears to have consisted, as the recent excavations and surface fieldwork have shown, of a large central nucleus of solidly massed huts, pits, and ditches originally protected by a great dyke which was totally obliterated soon after the Roman Conquest. This nucleus was surrounded by a wide area of country itself demarcated and enclosed by several more extensive lines of travelling earthworks, and probably containing a number of less important and satellite *kraals*. Now while it is true that at Colchester, as at Verulamium, excavation has not yet struck either the king's palace or his mint, the Colchester complex has at least a recognizable and thickly populated centre, in some part of which they presumably lie. But Belgic Verulam, as revealed by Dr Wheeler, has no such centre, for by no stretch of imagination can the Prae Wood ditches be equated with the dense occupation on the Sheepen Farm site at Colchester '.

This comparison or, rather, contrast, can only be described as naïve. It will suffice to say at once and quite bluntly that Mr Myres's summary of the Prae Wood earthworks and their contents is a misstatement of the essential facts. These facts are, I claim, sufficiently evident in the Report; in the *Antiquaries Journal* paper (which, of course, Mr Myres had not seen when he wrote), I summarized them as follows:

'A long series of extensive cuttings proved that the Prae Wood earthworks are of two dates, both within the half-century preceding the Roman invasion. A further series of cuttings (about fifty, all told) revealed, by trial and error, that the main Prae Wood ditch had continued southwards for over 1,000 yards through fields which now show no superficial indication of it. The plan had been bisected and terminated by palisades at right-angles with the line of the earthwork, the terminal palisade being sinuous as though to conform with the irregular margin of the woodland-clearing. Earthwork and palisades together imply a large enclosure or enclosures (just as three walls at right-angles to one another imply a room), and the whole system was doubtless completed towards the south-west by intact woodland, the main artificial defence being on the (geologically) more open hillside towards the north-east. The result would be a large enclosure of similar length and, likely enough, of approximately similar width to the second century Roman city; *i.e.*, an enclosure from 150 to 200 acres in extent.

'Within this large Belgic enclosure, it need not be supposed that the whole surface was covered with habitations, as were the smaller areas of some at least of our south-western *oppida*. Caesar, on the contrary, describing just such sites as Belgic Verulamium, remarks that they were refuges alike for men and for cattle. Excavation in 1931–3 suggested that our site had in fact fulfilled this dual role. An area of 4,000 square yards was systematically cleared behind the Prae Wood defences and was found to be seamed with drainage-ditches literally filled with occupation-debris. During the height of this work it was not uncommon for one or even two oat-sacks full of Belgic pottery to be brought away daily. Beside certain of the ditches were remains of cooking-ovens; but, for the rest, the loose sandy soil hereabouts had been completely riddled with tree- and shrub-roots and, above all, by the dense crop of bracken which makes the wood a veritable jungle in summer-time. Nothing is more destructive than bracken-roots of vestiges such as post-holes; and even on an open Belgic site such as that excavated with the utmost skill by Mr Hawkes and his colleagues at Colchester, the structural remains of hut-ments were, I understand, almost irrecoverable. Certain it is that the Prae Wood site, cleared slowly and with infinite care and patience by Mr Dermot Casey, had held Belgic huts but retained no definitely recognizable vestiges of their timbering. A smaller area cleared in 1932 by Mr Huntly Gordon near Prae Wood Farm showed similar evidence of ill-defined but abundant occupation. On the other hand further south in Pond Field, nearer the centre of the complex, a restricted area, cleared by Mr Casey, yielded but slight evidences of occupation and may have been entirely devoid of hutments.

'This patchiness is exactly what we are learning to expect on a Belgic site. A typical Belgic *oppidum* may turn out to have consisted in the main of a congeries of



Based on the Ordnance Survey 6-inch map, Herts., xxiv, by permission of the Controller of H.M. Stationery Office, and reproduced by permission of the Society of Antiquaries of London

separate hut-clusters, united within a more or less defined territory but lacking the coherence of a Wessex *oppidum*. In the latter, the fields and herds were wholly or largely extra-mural; in the former, the fenced area was liable to include at least some considerable part of the nearer farm-lands. This is not the context to consider the interesting divergences between eastern and western *oppida*, nor is the time yet fully ripe; but the matter is one which will in due course deserve a full discussion.'

I have quoted this summary in full because it happens to deal, almost point for point, with Mr Myres's difficulties. And one point in particular may be further emphasized. On more than one occasion, I was the happy spectator of the Colchester excavations to which Mr Myres refers; and I state quite plainly that, if from the Sheepen site be deducted all remains posterior to the Claudian conquest, the area excavated behind the Prae Wood earthworks was every bit as productive of pottery as was the Colchester site. True, the Colchester finds are far richer in foreign material, as befits a coastal site controlled by a far-sighted tyrant. But the nett evidence for population is closely similar. And surely even the most cursory reader of the Verulamium Report must have been struck by the fact, for example, that a single group of Belgic pottery in Prae Wood produced no fewer than seventy illustrated types. On turning to my plans, (*e.g.* Pl. XVI of the Report), I find that I wrongfully omitted to indicate the exact extent of clearances, but I affirm here and now that anyone who may be permitted to make further depredations in the Prae Wood game-coverts may increase his Belgic reserve almost *ad infinitum*. And again, in fairness Mr Myres may be reminded that the Prae Wood excavations, although considerable, formed only a part of an immense and widespread task, and were naturally more restricted in scope than the much more concentrated and specialized Colchester excavations; and yet the latter, no less than the former, have on Mr Myres's admission failed to discover the palace and the mint—incidentally a far more productive mint than that of Verulamium. Surely on all grounds Mr Myres's comparison with Colchester could scarcely have been less helpful to his self-imposed difficulty.

Now as to the 'Fosse.' This was proved, by five complete and many partial sections producing a large mass of evidence which was examined sherd for sherd by those best qualified to pass judgment, to date from the third quarter of the first century A.D. The large squarish area which it enclosed was accordingly identified, incontrovertibly, as the main area of the early Roman city. (Mr Myres, without discussion, uses the phrase 'optimistically labelled "early Roman city"', but Mr

Myres is there being merely naughty, and the phrase may be passed over). Mr Myres now knows why this early city has not been more extensively explored. But he is wrong when he states that ' not even a trial trench has been dug ' in it. The south-eastern side of the ' Fosse ' enclosure could not be fully determined, but on any showing the large temple-precinct south-west of the theatre was well within it. Now the numerous and extensive trenches cut to the natural surface in the course of the exploration of the precinct in 1934 revealed Claudian pottery and coins but no pre-Claudian deposit. They are referred to in the Report, p. 132, but Mr Myres has overlooked their significance. So far as it goes (and it goes some way) this may slightly modify Mr Myres's predilection for the area of the Fosse enclosure as an alternative Belgic city. It can scarcely be doubted indeed that the Belgic city spilled over its formal boundaries and that there were huts or even hut-clusters here and there upon the "Fosse" hillside; similarly I can show Mr Myres the remains of Roman buildings some hundreds of yards beyond the formal boundaries of Roman Verulamium. But when he remarks ' Is Prae Wood, perhaps, only an outlying element of a once larger whole ? ' and looks for ' other and more central elements ' on the hillside within the Fosse, he is forgetful of the fact that the Belgic earthwork-system of Prae Wood, etc., *faces outwards towards this hillside* and would therefore *exclude* any settlement there situated. In his effort to turn Belgic Verulamium upside-down, it is to be feared that Mr Myres has merely turned it inside out.

Two further points, and this private interchange between Mr Myres and myself shall cease. Commenting upon the later Roman defences, Mr Myres remarks : ' Dr Wheeler makes an overwhelming case for placing the construction of the defences in the second century ; it must however be said that the Hadrianic date which he presses seems hardly warranted by the evidence which he gives. . . . A very close parallel might be quoted from the Aldborough excavations of 1935. There too a Hadrianic date for the walls at first seemed certain . . . but the presence of two or three possibly Antonine sherds . . . has convinced the excavators that the defences of [Aldborough] cannot be safely dated before the reign of Pius '. Let us dispose of the latter part of this statement first. Mr Myres has recently given to the Society of Antiquaries a full and exceedingly frank account of the Aldborough excavations, and has admitted that, after no less than three seasons' work—in the course of which not a single complete and definitive section was cut through the defences and not a single gateway was tackled—the

original date of their construction is still uncertain within a margin of at least half a century. Mr Myres will be well advised to say very little about Aldborough until one or more further seasons' excavations there has straightened out this fragmentary and inconclusive piece of work. At Verulamium, three large gateways and two wall-towers were completely excavated, three large sections were cut completely through the defences, and the whole of the southern corner with its complex ditch-system was laid bare. The work was supervised in detail and independently by Miss Kenyon, Mr P. K. Baillie Reynolds and Mr Dermot Casey. The datable evidence recovered was immense in quantity, every sherd was carefully examined by all of us, every fragment of Samian was seen by Dr Davies Pryce, and specially significant pieces were referred also to Dr Felix Oswald. The result was absolute unanimity of diagnosis within a margin of ten years, which is as near as second-century pottery will take us. In summarizing the discussion I observed that ' the great mass of pottery sealed by the defences consists of types not likely to be later than *c.* A.D. 120, whilst the latest datable sherds—only two or three in number—need not be later than *c.* A.D. 130, and are in any case unlikely to be later than *c.* A.D. 140–50. The extreme scarcity of these relatively late sherds (which, be it interpolated, are fully recorded in the Report) supports an early dating for them within the margin of possibility ' (Report, p. 75). And then—although Mr Myres omits to recall the latitude of its judgment—the Report concludes : ' On all grounds, positive and negative, the evidence abundantly confirms a date not later than the second quarter of the second century A.D. for the re-fortification of Verulamium, with a strong indication that the work occurred rather in the reign of Hadrian than in that of Pius '—but, be it observed, not excluding more than half of the reign of Pius as a possibility ! Mr Myres's treatment of the whole matter is, shall we say, a little out of focus.

Finally, there is the question of the publication of Roman pottery-types. Two points arise : what *should* be done, and what *has* been done. As to the former my view, and the view of others, is this : that in dealing with a vast and complex site such as Verulamium, fraught with historical implications of the first magnitude, the main report should confine itself mostly to the statement and illustration of such evidence as is of primary historical significance—evidence bearing, notably, upon the dating of structures and so indicating the material vicissitudes of the site. The converse process—the assessment of the bearing of those vicissitudes upon the grouping and classification of

ceramic (and other) evidence in detail—is a secondary work, necessary in itself but less urgent and vital. And as to the second point—what in fact has been done at Verulamium in the publication of Roman pottery—I will briefly state the facts without comment. Mr Myres grudgingly observes : ' It is indeed remarkable that drawings of as many as 84 Roman pots have somehow been squeezed in ' to the Report ; although ' from the later periods, the third and fourth centuries, practically no pottery has yet been illustrated at all '. Now Mr Myres has a growing reputation as a scholar and it is unnecessary to remind a scholar of the literature of his subject. But, since he omits to do so, I must remind his readers that Miss Kenyon's paper on the Verulamium theatre, published in *Archaeologia* LXXXIV (1934) to relieve the main Report, illustrates a further 32 Roman pottery-types, mostly of the fourth century ; and that 212 sectional drawings of pots from the Verulamium cemetery at St. Stephens have been published in the *Transactions of the St. Albans and Hertfordshire Architectural and Archaeological Society*, 1935, by Dr Norman Davey, who worked in close liaison with the Verulamium Committee. Attention is drawn to his work in the Report, p. 135. With a total of 328 published drawings to its credit, I affirm that the Roman pottery of Verulamium has been given a flying start.

The last word in this rejoinder, however, shall rest with a more discerning judge than either Mr Myres or myself. I am reminded opportunely that that great man, Mr Bertram Wooster, has laid down for all time the fundamental principle of attack, and I would commend it to Mr Myres's earnest thought : ' The first thing you need in matters of this kind, as every general knows, is a thorough knowledge of the terrain. Not know the terrain and where are you ? Look at Napoleon and that sunken road at Waterloo. . . .' Mr Wooster then adds two characteristic words which I omit in the present context.

Notes and News

AIR-PHOTOGRAPHY

Early in this year Mr Crawford received an official invitation from Germany to organize an exhibition of archaeological air-photographs in Berlin and to deliver a lecture on them there in March. The consent of the Director-General of the Ordnance Survey Office was given, and a typical set of about 40 enlarged air-photographs (together with about 100 smaller ones) was lent for the purpose. In addition, Major Allen kindly allowed a selection to be made from his own remarkable collection, which so brilliantly illustrates the archaeological value of air-photography. The purpose of the exhibition was to inaugurate an intensive campaign of similar work on German soil; and with this object invitations were sent out by the Lilienthal Gesellschaft, by whom all the arrangements were made in Berlin, to officers of the German Air Force on the one hand and to the leading archaeologists of Germany on the other. The proceedings took place in what was the Upper House of the former Prussian Parliament, and consisted of the discussion of technical problems, which were illustrated from the photographs exhibited. Amongst them were those already obtained by German pilots, who have shown a keen interest in this branch of research, and have now begun to collaborate successfully with the archaeologists. Amongst the German air-photographs exhibited were some of a fortified medieval site (Pfalz Werla), whose outer defences were thus revealed and subsequently excavated. In addition, Mr Crawford detected, on some of the other photographs, traces of an earlier (probably medieval) field-system similar to that which had been observed by him from the air between Cologne and Brussels. The discussions occupied two days, and concluded with a lecture by Mr Crawford at which several hundred people were present. The lecture was preceded by an address in which Dr Buttler explained, for the benefit of those present who were not experts, some of the principal archaeological terms and periods, and was followed by a short summary, by Ministerialrat Ewald, of the results obtained in Germany.

It was generally agreed that the objects of the meeting had been obtained, and that a very profitable and pleasant two days had been

spent. The proceedings are to be published by Lufthansa in the form of an illustrated monograph, which will be widely distributed amongst all concerned ; and it is confidently expected that good scientific results will soon be obtained. The whole affair was organized with the keenness, thoroughness and efficiency which one accepts as a matter of course in Germany. The writer takes this opportunity of once more expressing his thanks to all those concerned for their kindness and hospitality, particularly to the officers of the Lilienthal Gesellschaft and Lufthansa.

After the meeting the writer took the opportunity of flying by Lufthansa to Athens, on business connected with the Greek portion of the Map of the Roman Empire. Between Budapest and Belgrade, nearer to the latter place, he observed many soil-marks, consisting of long narrow white bands forming a connected pattern. Probably these are the vestiges of an ancient field-system. Whatever their age and original intent many of the marks seem to have no relation to the existing field-system, which itself has the appearance of considerable antiquity. It would be easy to decide this point if a large area were photographed from the air under suitable conditions (*i.e.*, during a dry spell in the spring), and a mosaic constructed. Subsequent excavation at selected points would decide the matter. In addition the writer noticed the outlines of three Roman camps plainly visible in arable land ; and the courses of several of the defensive dykes, some of post-Roman date, were observed. The existence of these dykes, of several miles in length, has of course long been known ; but they have not yet been properly fully investigated. Here is one of the best fields in Europe for combined field-work on the ground and from the air. It is to be hoped that our archaeological colleagues in Yugoslavia will follow the example of Germany and inaugurate work in this unexplored, and most promising, field. Should they decide to do so, they can certainly count upon the cordial cooperation of workers in other lands, who would gladly give them the benefit of their experience.

O.G.S.C.

EARLY MAPS AND TIDE-TABLES

There appeared in ANTIQUITY for December 1937, XI, 486–9, a brief description of a little volume of maps and tables, block printed on twelve parchment leaves, and catalogued in the Bodleian Library as Ashmole 1352. There seems every likelihood that this is a copy of a book which the present writer has long been anxious to find, and which

is thus described in a letter* from John Bagford to Thomas Hearne, written in February 1715 :

> ' The first step that was made towards the knowledge of the Coasts of England was by an Almanack, with a Chart of the Coasting Part of England, in a small portable Volume bound and printed on Velam, or rather Parchment, by Winken de Word, An. 1520. This is the first I have seen of that kind, altho' before as well as since such Coasting-Charts were made by hand for the Benefit of Pilots '.

As Bagford says, manuscript examples are not uncommon (there is one in the National Maritime Museum at Greenwich) and the manuals are obviously of French provenance. They are in fact books of tide-tables, giving very necessary information to ship-masters engaged in the Gascony wine trade. The sphere of this trade is indicated by the area mapped. It extended northeastwards to Zeeland in the Low Countries; northwards to St. Andrews and Loch Ryan on the respective east and west coasts of Scotland ; northwestwards to Orfleet (Old Fleet Harbour, *i.e.*, Larne) and Sligo Bay on the opposite shores of Ireland ; while southwestwards it embraced the north, that is to say the non-wine producing, coast of Spain as far as Cape Finisterre in Galicia. As one of the maps reproduced indicates, the original of the printed example was compiled while the English flag still flew over Bordeaux, and this tallies with the deduction to be made from the table of movable feasts described by Mr Philip, namely that the date of compilation was 1450. Aquitaine was lost to the English crown in 1453.

In the manuscript room at the British Museum there is an English copy of just such a French manual made by a seafaring man, one William Marshall, for the library of the Earl of Arundel, about the middle of the sixteenth century. This has been briefly described by the present writer in the course of an article on an Italian Navigating Manual which will be found in the *Geographical Journal*, LXXVIII, 346. Before comparing this with Mr Philip's example, the method of using the maps and tables must be made clear. The compass diagram (or ' rose ') to be found on each section of the maps (described by Mr Philip as ' pointing in the wrong direction ') is meant to be used as a twenty-four hour clock, and hence its orientation is immaterial. The north-point (or ' lily ') represented midnight, the south point noon, 9 p.m. was NW, and so on, all round the circle. An examination of the charts will show that a series of lines (ornamented with scroll work of no significance) run from particular compass points to particular ports and estuaries. These give the times of high water in the respective harbours

* *Leland's Collectanea*, ed. T. Hearne, 1715, vol. I, p. LXXIX.

when there is a new moon. Referring for example to the map of England on PLATE XIV (ANTIQUITY, facing p. 489) we find that a line runs from the south point on the compass to the Thames estuary. This indicates that with the new moon, high tide occurs there at noon. Full tide at the Isle of Wight and on the Norfolk coast is ' at S.E.', *i.e.*, 9 a.m. ; in the Bristol Channel and on the stretch of coast between the Lizard and Portland it is at 6 p.m. (W). In the Irish Sea the time of high tide is to be read from the compass-rose on the opposite page. It is at ' SSE.', *i.e.*, 10.30 a.m. Reference to a modern map of co-tidal lines will show that all these times are approximately correct. The maps, as we have seen, only give the time of high tide when the moon is new. Further tables are necessary, owing to the daily retardation of the time of high-water consequent on the motion of the moon. These are given in the form of the ' nine circular tables ' (there are usually eight) to which Mr Philip refers. Two of them are reproduced in the article by the present writer cited above. The method of using them was as follows. In the first place the seaman referred to his current Almanack to find the ' age of the moon ' (the number of days since new moon) on that date. He then turned to the appropriate circular table for the port he proposed to enter. If, for example, he was going into the Thames, he would turn to the diagram marked ' South ' : if he was going to Bristol, to the diagram marked ' West ', and so on. Round the outer circle he sought for the figure corresponding to the age of the moon, and beneath it he found the times of high and low water to the nearest quarter of an hour. The table also showed him the days of spring and neap tides within the lunar month. The fact that sailors divided the hour into quarters and not into minutes involved the use of a daily retardation of three-quarters of an hour, instead of the more correct figure of 48′ used by astronomers. How this discrepancy was adjusted is discussed by A. E. Stephens in an article entitled ' The Booke of the Sea Carte ' in *Imago Mundi*, vol. II, 55. It will be readily appreciated that as the tides were of little importance in the Mediterranean the matter was accorded but slight treatment in Sea Manuals of Mediterranean or Portuguese provenance. To the Bordeaux pilot trading along the Atlantic margin, such knowledge was vital, so that the French authorship of the tide-tables is easily explained. Since the names on the charts indicate the ports commonly visited by the wine-boats in the fifteenth century their elucidation is of value to the historical geographer. A list is subjoined of the names appearing in Marshall's transcript, so far as they refer to the British Isles. Where he omits

names found on the Bodleian example these are added in square brackets, and this is also done where an emendation of Mr Philip's reading is suggested.

Loc derien (Loch Ryan)
Loch derien (Loch Ryan)
Murdegaloe (Mull of Galloway)
Huserne (Whithorn)
Quicoube (Kirkcudbright)
Pilsente (Piel Sand)
Lerpole (Liverpool)
Chestre (Chester)
Beomai (Beaumaris)
Holie hed (Holyhead)
Carnarvon (Carnarvon)
S. David (S. David's)
Milford (Milfordhaven)
Tunby (Tenby)
Bristowe (Bristol)
Lesorde (Lizard)
Fawlmoth (Falmouth)
Facam (Fowey)
Plymmoth (Plymouth)
Dartmoth (Dartmouth)
Tocsm̃ (Topsham)
Porteland (Portland)
[Olfast] (Handfast Pt.)
Pole (Poole)
Hampton (Southampton)
Portesmouthe (Portsmouth)
S. Richarde (? Seaford)
Beocheff (Beachy Head)
Dover (Dover)
London (London)
Arporte (Orford)
[Quilique (Walberswick)]
Yarmouthe (Yarmouth)
Lecu (Lincoln *or* Lynn)
Hull (Hull)
[Queff (Whitby ?)]
Newcestell (Newcastle)
[Ners (?)]
Barwic (Berwick)
Dunbar [Dembar] (Dunbar)
[Petilit (Burntisland)]
S. Andre (S. Andrew)

Cleer (C. Clear)
Valantimor (Baltimore)
Glandor (Glandore)
Kynesall (Kynesale)
Cork (Cork)
Ocla (Youghal)
Waterforde (Waterford)
Oacseforde (Wexford)
Arclow (Arklow)
Dovbyn (Dublin)
Drowada (Drogheda)
Dendaucle (Dundalk)
Carinforte (Carlingford)
Arglas (Ardglass)
Straforte (Strangford)
Coblatines (Copeland Is.)
(Inis=island)
Granforges (Carrickfergus)
Kre (Magee Is.)
Orflute (Oldfleet) (Larne)
Dermart (? Marlough)
[Slia (Sligo)]
[Lars (?)]
Galoe (Galway)
Limerick (Limerick)

As will be noticed, Marshall has anglicized many of the French forms, while leaving out others, *e.g.*, Queff, Nerf, or Ners, for which, like the modern investigator, he is unable to recognize any equivalent. The harbours visited naturally changed with the lapse of time, and the fact that their names were written down phonetically by foreign pilots has created a further difficulty of identification. Faulty copying, too, is likely to have taken place, *e.g.*, *Pilsente* for Piel Sand, and Marshall's *Facam* for Fowey.

The tide-table and tide-map manual (in manuscript) preserved at the National Maritime Museum, and belonging to the same type as the Bodleian and British Museum examples has some additional names. In Scotland it extends further north, Montrose and Aberdeen being marked on the east coast, Loch Fyne and an unidentified ' Sondik ' on the west coast. On the Cumberland coast Workington and Ravenglass are added, and I am hence inclined to equate *Pilfont* (*i.e.*, Pilsont) to Piel Sand in front of Walney Island. On the northeast coast of England the names are as follows :—Berwick, Holy Is., Bamborough, Coquet Island, Tynemouth, Hartlepool, Rawcliff (Raquele), Hunmanby, Flamborough, Hull. This suggests that the ' Queff ' of the Bodleian example is Rawcliff. I think that Lecu or Lecn following Yarmouth is rather doubtfully Lincoln, as this would have no tide : more possibly it is Lynn. These tide-maps could usefully be collated with the contemporary portulan charts, and no doubt the material is at hand in the MSS of the late Michael Andrews now at the Royal Geographical Society. There are clearly two classes of names—land marks and ports of call : the latter relevant for medieval trade routes. In this connexion see also E. F. Bosanquet : ' The Flye 1569 ' which throws a side-light on the young sailor's way of mastering his tidal data if unable to read. This article is in the *Trans. of the Bibliographical Society*, 1937.

E. G. R. TAYLOR.

A good many letters have been received about the identifications published in the note on Early Maps (ANTIQUITY, December 1937, 486–9). The following is an attempt to sort out some of the information received, as much of it overlaps.

Several readers have written pointing out that S. Richart must be Chichester, which is associated with St. Richard of Wych (Droitwich) who was canonized in 1263.

Professor Minns adds that Quiliqe must somehow be Dunwich and that Lecu is Lynn, not Lincoln.

Mr Keef suggests that Petilit may be Leith.

Mr Tapley-Soper suggests Topsham for ' Tocsm '.

Mr D. A. Chart, Deputy Keeper of the Public Record Office of Northern Ireland, identifies Granforges with Carrickfergus, and Orflet almost certainly with Alderfleet, one of the old names for what is now called Larn Lough.

The name Pilfout has elicited many suggestions, from which the following are extracted :—

Lt.-General Sir Matthew Fell writes : ' It seems to me that this must refer to " Pile of Fouldrey " where Martin Smart landed in the spring of 1487—with Flemish and Irish Troops in support of Lambert Simnel, the Pretender to the English Crown. An illustration of the " Pile of Fouldrey " is included among Daniell's colour prints, *Around the coast of the British Isles*, published in 1816. The harbour is now known as " Piel Harbour " at the entrance of the channel leading to Barrow-in-Furness. " Piel Castle " is described in the later editions of West's *Antiquities of Furness* and many local publications '.

Miss Marjorie Cross suggests that [ ]omtail may be an effort at Tantallon. She too thinks, with others who have written, that ' Pilfout ' can only be the ' Pile of Fouldrey ', the ruin now known as Piel Castle.

On the other hand the Rev. W. S. Sykes ventured to suggest that Pilfout is more correctly Pulfout, the port of Millom in the Duddon Estuary. He quotes from *Trans. of the Cumberland & Westmorland Arch. Society*, XXI, 78, that Powesfoot in Millom is named in a list of ports in 1566. ' It is not shown as a place of great importance but as the Duddon estuary is one of the larger openings on the coast it may have attracted notice. The Powesfoot is not on the 6-inch Ordnance map but it was in the bay called Borwick Rails Harbour, formed by the mouth of three small creeks. The creeks are marked on the Ordnance map as Salt Home Pool, Rottington Pool and Crook Pool. The port itself was I think at the harbour, close to which is a wharf now used by the Iron Works. That the word pool has changed to Powe is shown in a place-name a few miles away where Lairwathpool of a charter *c.* 1180–1210 has now Pow or Po' House at the head of it and Helpowe Bridge at the foot '. [We cannot publish any more notes on this subject.—Ed.]

ESSAY ON EGYPT

In ANTIQUITY for December 1936 notice was printed of a prize to be offered for an essay on some archaeological or ethnographical subject (not mainly linguistic or literary) connected with Prehistoric or Pharaonic Egypt.

The Committee reports that it is very gratified at the response, the following ten essays having been sent in. They came from England, America, France, Egypt, and the Sudan, and are listed in the order in which they were received.

1. The Lamps of Ancient Egypt.
2. Some new light on the beginnings of Egyptian Civilization.
3. The Labyrinth of Hawara.
4. Ancient Egyptian Agriculture.
5. The Liver's significance to the Egyptians, Minoans, and Babylonians.
6. The Rock-pictures of Lower Nubia.
7. Beekeeping in Ancient Egypt.
8. Prehistoric steatopygous figures from Egypt and elsewhere.
9. The ' First Intermediate Period ' of Egyptian History.
10. An unusual Insignia.

The standard was high, and more than one essay was of outstanding merit. One competitor had not noted the phrase in the advertisement ' not mainly linguistic or literary '. Several excellent papers were unfortunately too limited in scope to compete with the four more important ones. After careful consideration of the subject-matter, outlook displayed, importance of the results obtained, etc., the prize was unanimously awarded to Essay 9, *The ' First Intermediate Period ' of Egyptian History*, which proves to be the work of Mr Theodore Burton Brown. It is hoped the author may be able to publish what is clearly a valuable contribution to our knowledge of early movements in the Near East. K. DE B. CODRINGTON, M. A. MURRAY, G. A. WAINWRIGHT.

SICILIAN BRONZE AXE FROM NEAR HENGISTBURY HEAD (PLATE I, FIG. 1)

The bronze shaft-hole axe shown on PLATE I, FIG. 1, was found in September 1937 by Mr H. C. Audin, of Bournemouth, while beach-fishing at a point ¼ of a mile east of the present (1938) east end of the new promenade at Southbourne-on-Sea in Hampshire (6 in. o.s. Hants. 86 SE), and has since been acquired by the British Museum. The axe, which had been knocked sideways somewhat out of shape, was hauled up by Mr Audin on his line, together with some other objects consisting of old rope or tow and a portion of a mechanic's overalls with brass rings attached. The axe had a tuft of boot-lace sea-weed growing on it; this Mr Audin scraped off. The total weight of the haul he estimated at about 9 pounds, and it came up from the sea some 50 yards or so below low water-mark. The exact spot was just south-east of

the wooden staircase down the cliff 200 yards west of Sandymount and 700 yards ESE. of the Gordon Hotel (Lat. 50° 43′ 8″, Long. 1° 47′ 59″ W).[1]

The whole neighbourhood is prolific in prehistoric remains. About half a mile to the east are some pits, still visible in the cliff section which shows quantities of burnt flint (pot-boilers ?). Somewhere not far inland from here were found two bronze palstaves which before the war were in the possession of a dealer named David Chambers, in whose shop at Southbourne they were seen and drawn by Mr Crawford.[2] Another was in Mr Druitt's collection in 1912. Near the Indian Hut, further inland still, was found the double-looped palstave (of Iberian affinity) now in the possession of Lord Malmesbury[3]; and the Pokesdown urnfield is not far off.

The spot is only 1½ miles west of the Double Dykes which defend Hengistbury Head, the bulwark of Christchurch Harbour and the mouths of the Stour and Avon, well known as a port of entry and traffic to the hinterland of 'Wessex' throughout prehistoric times. Here converging land-routes from all over Britain met sea-ways down-Channel from the east, from the mouth of the Seine and the peninsula of the Manche, and in the other direction not only coastwise from Cornwall and Ireland but from the southwest, above all from Brittany and the Atlantic route beyond from Iberia and the Mediterranean. The importance of the 'Christchurch entry' in Neolithic and Early Bronze Age times has often been emphasized, and Mr Stuart Piggott's excavation of the Holdenhurst long barrow nearby, and his recent paper to the Prehistoric Society on the Early Bronze Age in Wessex, are simply two of the most recent cases in point; the Middle Bronze Age continues the same story, and with the Late Bronze Age we reach a period notorious for its evidence of incomings from abroad. The central European origin of its dominant new bronze types, the socketed axe and the sword, and likewise that of the 'Urnfield Movement' at

[1] These facts were communicated to Mr Crawford by Mr Audin who kindly pointed out the exact spot to him from the wooden staircase halfway down the cliff. It is due to Mr Audin's interest that this valuable evidence was preserved in the first instance and that it has now found a safe home in the National Museum where it is available to students. (The supplementary facts thus obtained have been incorporated in Mr Hawkes' note).—EDITOR.

[2] One was said to have been found 'in the pinewoods, West Southbourne, at a depth of 2 feet below the present surface, resting on the top of the gravel, June 6th, 1910'; the other (which was only 4½″ long) was said to have been 'found near the British village, Pokesdown, 1911'.

[3] *Proc. Soc. Ant. London*, 1911-12, Ser. 2, XXIV, 43-44.

least ultimately responsible for its immigrations of Deverel-Rimbury urn-people, tend to make one partly lose sight of the fact that the old Breton-Atlantic sea-route was still in active use. But this way came the Breton square-mouthed socketed axes well known in our southern counties : beyond Brittany those axes are distributed as far as the south of France, and in the double-looped palstave and the ' trunnion celt ' the southwest and west of Britain show trade connexions in this period as far afield as Iberia. In the region of Tartessus where the commercial wealth of Iberia found its maximum concentration, the harbour of Huelva has produced the famous bronze hoard in which together with ' carp's-tongue ' swords and other well-known types, two socketed spearheads of distinctively British type, one with lunate openings in the wings, occur side by side with fibulae no less distinctive of the latest Bronze Age of Sicily (Ebert, *Reallexikon* v, 395-6, taf. 130). Though there are Siculan and south Italian spearheads with eyelets at the base of the blade which may be related to the ' basal-loop ' type of the same British family, it is rather the British end of the implied trade-route which shows signs of influence from the mid-Mediterranean than vice-versa. Our ' maple-leaf ' bronze razors of this period have their closest parallels in just the same context in Sicily, and Mr Leeds has marshalled suggestive evidence to show that our contemporary cauldrons and buckets are to be traced this way back to their Mediterranean prototypes. But examples of actual Mediterranean objects imported this way into Late Bronze Age Britain are rare. There is a very Italian-looking spearhead in the British Museum from Thames Ditton, but though a late Italian socketed axe might stray as far as Beesel-on-Echt in Belgium,[4] this country has nothing of the kind to show, and in particular none of the various Italian brooches of Late Bronze or Early Iron Age date found in this country has ever come to light under test conditions able to dispel the suspicion attaching to them as likely modern collector's pieces. In any case they include no example of the particular type represented at Huelva, though that this was carried further in our direction is shown by its occurrence in two Late Bronze Age hoards in west France, Vénat (Charente) and Notre-Dame-d'Or (Vienne), nos. 94 and 735 in Déchelette's list (*Manuel*, II, app. IB ; cf. pp. 327-330).

The type in question is the elbow-brooch (*fibula a gomito*), an early stage in the development of the serpentine form : good examples are figured by Déchelette (*Manuel*, II, fig. 130) and by Peet (*Stone and Bronze*

[4] Unpublished : Cinquantenaire Museum, Brussels ; Mr G. C. Dunning has kindly communicated a drawing.

Ages in Italy and Sicily, fig. 245), and the chronology of the Cassibile cemetery and its like in Sicily, of which it is characteristic, dates it to the last phase of the Siculan II period, which is usually made to end about 800 B.C., or at any rate before the Greek colonization of Syracuse in 734. The Huelva and west French hoards make this a synchronism for the British and French Late Bronze Ages, and even though no such brooch-containing hoards have yet been found in Britain, the whole context is sufficiently clear-cut to validate even an isolated British find of any type which can be shown to belong to it. And this is precisely the case with the Southbourne-Hengistbury axe. These rather heavy shaft-hole axes are typical of just this latter part of the Siculan II period, and are well distributed in Sicily and in south Italy. They are amply represented in the British Museum (*Cat. Bronzes*, nos. 2942 ff.; *Bronze Age Guide*, fig. 158), both with and without a knob behind the shaft-hole and an associated ridge-moulding on either face. As in the type-illustration given by Peet (*op. cit.*, fig. 269), this feature is well shown on the Southbourne example: it is a definitely Sicilian character, though axes made without it are equally typical. The standard case of association between these axes and the elbow-brooches is the hoard found in 1898 at Modica not far from Syracuse, where two fine elbow-brooches appeared together with one large and two smaller shaft-hole axes, socketed axes, local forms of 'trunnion celt', socketed spearheads, two swords of an ultimately Mycenaean-derived type, etc., and the blade of an iron knife (*Bull. Paletn. Ital.* XXVI (1900), 166 ff. and tav. XII). The iron knife is a Siculan III type, as at Finocchito (*ibid.*, XXIII, 196), and points to a date for the hoard near the borderline between II and III about 800–750 B.C. The discovery of such a characteristically Sicilian axe of this period in Britain thus strengthens the evidence here recalled for the use of the Mediterranean–Atlantic trade-route in the Late Bronze Age, and it is fitting that it should have been found on the beach so close to the prehistoric harbour alongside Hengistbury Head. C. F. C. HAWKES.

BANK-BARROWS (PLATE I, FIG. 2)

The long burial-mound recently discovered and excavated by Dr Wheeler at Maiden Castle is of exceptional interest to British field-archaeologists. The leading facts were described by Dr Wheeler in his annual report delivered before the Society of Antiquaries on 24 February last, and in his article in *The Times* (25 February). The total length was 1700 feet, and the mound passed over the top of the

ditch of the neolithic camp which was already silted up when the burial-mound was constructed. Its sepulchral character was proved by the discovery of primary inhumations. The burial-mound was flanked on either side by a ditch which did not continue round the ends. Its coordinates are Lat. 50° 41′ 40″, Long. 2° 28′ 11″ w. Plainly it has many points in common with typical earthen long barrows, from which it differs mainly in its very much greater length. It seems desirable to have some word to describe mounds of this kind, and for convenience I have here used the term ' bank-barrow '.

Two other bank-barrows are known in Dorset. One of them is on Long Barrow Hill, a part of Martin's Down, in the parish of Long Bredy (Dorset 39 SW.; Lat. 50° 43′ 4″; Long. 2° 36′ 25″ w). It is 630 feet long, has parallel side-ditches, and runs along the crest of a low hill exactly like its longer counterpart at Maiden Castle. It is oriented SW.–NE., and has a break or depression running across it NE. of the middle point. A curved bank crosses the hill at its SW. end and another, L-shaped (not marked on the O.S. map) lies at its NE. end. It stands in the middle of a group of eight round barrows, with an additional long one of the ordinary type (*Neolithic Wessex*, no. 139) close by. At the cross-roads immediately to the NW. is another group of five round barrows, while to the north is a standing stone. North of it is the modern Dorchester and Bridport road, which here joins a ridgeway of probable prehistoric origin. There are two more long barrows (*Neolithic Wessex*, nos. 140 and another, accidentally omitted) and four round ones three quarters of a mile SE. of the bank-barrow.

Another, slightly longer, bank-barrow is situated on the down east of Came Wood (Dorset 47 SE.; Lat. 50° 39′ 59″; Long. 2° 25′ 14″w). It lies in the western angle of Broadmayne parish, east of a row of round barrows, amongst which is that called Culliford Tree. There is a normal long barrow (*Neol. Wessex*, no. 154) north of Culliford Tree. About a mile to the SSW. is Chalbury camp. The bank-barrow lies parallel to a ridgeway on the south which is the eastern continuation of the one referred to in the last paragraph. Throughout its course the ridgeway is thickly set with rows and clusters of barrows which are still prominent objects on the sky-line. Nowhere else in England, except perhaps round Stonehenge, is there such a concentration of burial-mounds.

By a lucky chance I hit upon an exact continental parallel to these bank-barrows during a recent trip to Schleswig-Holstein. Three such exist between the towns of Schleswig and Eckenförde, about eight miles

SE. of Schleswig ; they lie to the west and north of the village of Kochendorf, between a lake called Windebyer Noor and the deep fjord of the Schlei. None is marked on the national map (scale 1 : 25,000, sheet 302).[1] The first (Lat. 54° 28′ 50″ ; Long. 9° 44′ 5″ E), only very imperfectly recorded on Dreyer's map of 1860, lies west of an old ford called Dürwade ; here an old and doubtless prehistoric east-and-west track crosses the Osterbek, running from Eckenförde on the east by Schnaap, north of Kochendorf, through Götheby-Holm and Fleckeby towards the main north-and-south route beyond Schleswig. The bank-barrow is at least 380 metres (about 1250 feet) long, but may be much longer, as its western end fades gradually out in cultivated fields and the eastern end is also uncertain. Parallel to and almost in contact with it are three long barrows, two on the north (about 65 and 70 paces long) and one on the south (rather shorter, but cut through by a modern field-bank and therefore difficult to investigate). Immediately to the south is a group of four and perhaps more round barrows.

There are two more bank-barrows in the wood of Christianshöh, between Kochendorf and the Schleswig-Eckenförde-Kiel road, and east of the lake called Gr. Schnaaper See. The westernmost (Lat. 54° 29′ 25″ ; Long. 9° 45′ 40″ E) cuts across the angle between the main road and the sandy track to Christianshöh and Kochendorf. It can plainly be seen as a bump in this track and in the boundary banks on either side. In the field west of the track it appears as a low mound of loose soil of a lighter colour and more stony than the rest of the field. The mound is oriented ENE.–WSW. and the eastern end is in the forest, just south of the main E.–W. ride running parallel to the main road and some 130 metres south of it. It is about 600 metres long. It is difficult to discern on account of the fir-trees ; but the third, which lies about 500 metres east of it is easier to trace (Lat. 54° 29′ 30″ ; Long. 9° 46′ 20″ E). It is oriented NE.–SW. and crosses a cinder-track leading from the main road to a house near a shooting-butt. Measured along the mound itself, its SW. end is 190 paces from the point where it is crossed by the cinder-track. The width is about 20 paces, and it is still at least 2 feet high at its best preserved points. It crosses the main road at the NE. corner of the wood where the road to the house enters it, and there is a very well-preserved fragment visible in the hedge immediately east of the gate here. It is plainly visible as a bump in the hedge on the north

[1] The national maps of Germany do not mark any antiquities except those which are prominent topographical features, and even these are undescribed. Of the 32 barrows visited that day only 6 are marked on the map.

side of the main road (PLATE I, FIG. 2), and can also be seen (less evidently) in the next (north and south) field-bank, beyond which it disappears. The total present length is 450 metres.

None of these bank-barrows has any visible ditch ; but then neither have any of the round barrows. If such ever existed they have disappeared in the loose sandy soil. (It is to be noted that often no traces of ditches are visible on the surface even when, as in the case of that celebrated linear earthwork, the Danewerk, they have been proved to exist by excavation). Nor are any large boulders or other megalithic remains now to be seen in or around them. This, however, proves nothing, for such may well exist beneath the surface, or have been removed in later times. All three are closely associated with groups of round barrows. (On the day I inspected them I also saw and marked on the map no less than 26 round barrows within a radius of two kilometres north and west of Kochendorf ; and there is probably another large group immediately south of the village).

There seems every reason to associate these three bank-barrows 380, 450 and 600 metres in length, with the three at present known in Dorset. Possible Germanic or Danish affinities have already been suggested for our Kentish megaliths ; and although it is a long way from Schleswig to Dorset there is no reason to suppose that some connexion may not exist. The complete clearance, by excavation, of one of the Schleswig bank-barrows is an undertaking that would be welcomed by British students, and may be commended to the attention of the very active Kiel group of archaeologists. (The westernmost bank-barrow, near Dürwade, would probably be the easiest to excavate, since it is not encumbered with trees).

In conclusion, I wish yet once more to thank Prof. Schwantes and my other kind friends, of Kiel, and particularly Dr Jankuhn, Dr Kersten and Dr Haseloff, without whose help I might never have come across these interesting objects. The three bank-barrows are incidentally mentioned (with a site-plan) in an article by Herr Willers Jessen, of Eckenförde, published in OFFA, Band 2, 1937, pp. 105–110. They are situated near the Oster Wall, probably an eastern continuation of the Danewerk or of the associated Kograben ; and it was on account of this fact that I came to visit the district in the first instance.[2]

Since writing the above my attention has been called to published plans of stone-set burial-places in Schleswig-Holstein. For this I am

[2] An article on the Danewerk by Dr Haseloff, is published in the same number of OFFA. Dr Haseloff has promised to write an account of the Danewerk for ANTIQUITY.

indebted to Dr Grahame Clark. One of these, whose breadth-length proportion is 1:15, is at Tarbek, Kr. Segeberg (*Geschichte Schleswig-Holsteins* Band 1, lieferung 3 : tafel 13 : by Gustav Schwantes). The actual length, however, is not stated and the plan has no scale. The burial-place itself consisted of an arrangement of 6 boulders (two on each side and one at each end) covered by two capstones, the whole at right-angles to the long axis of the setting, a characteristic feature of the monuments in this region, as contrasted with those of Denmark. There appears to be, in these ultra-long settings, no difference in width at either end ; they are long narrow rectangles. Remains of the covering-mound seem to be indicated in the published profile of the Tarbek monument.

These monuments are obviously identical in character with the bank-barrows we have been discussing.

NORSE RELICS IN ONTARIO

The following note is reprinted, by permission, from the *Geographical Journal*, April 1938, XCI, 395–6. We may say that information about the discovery had already reached us privately, but without the necessary permission for publication.

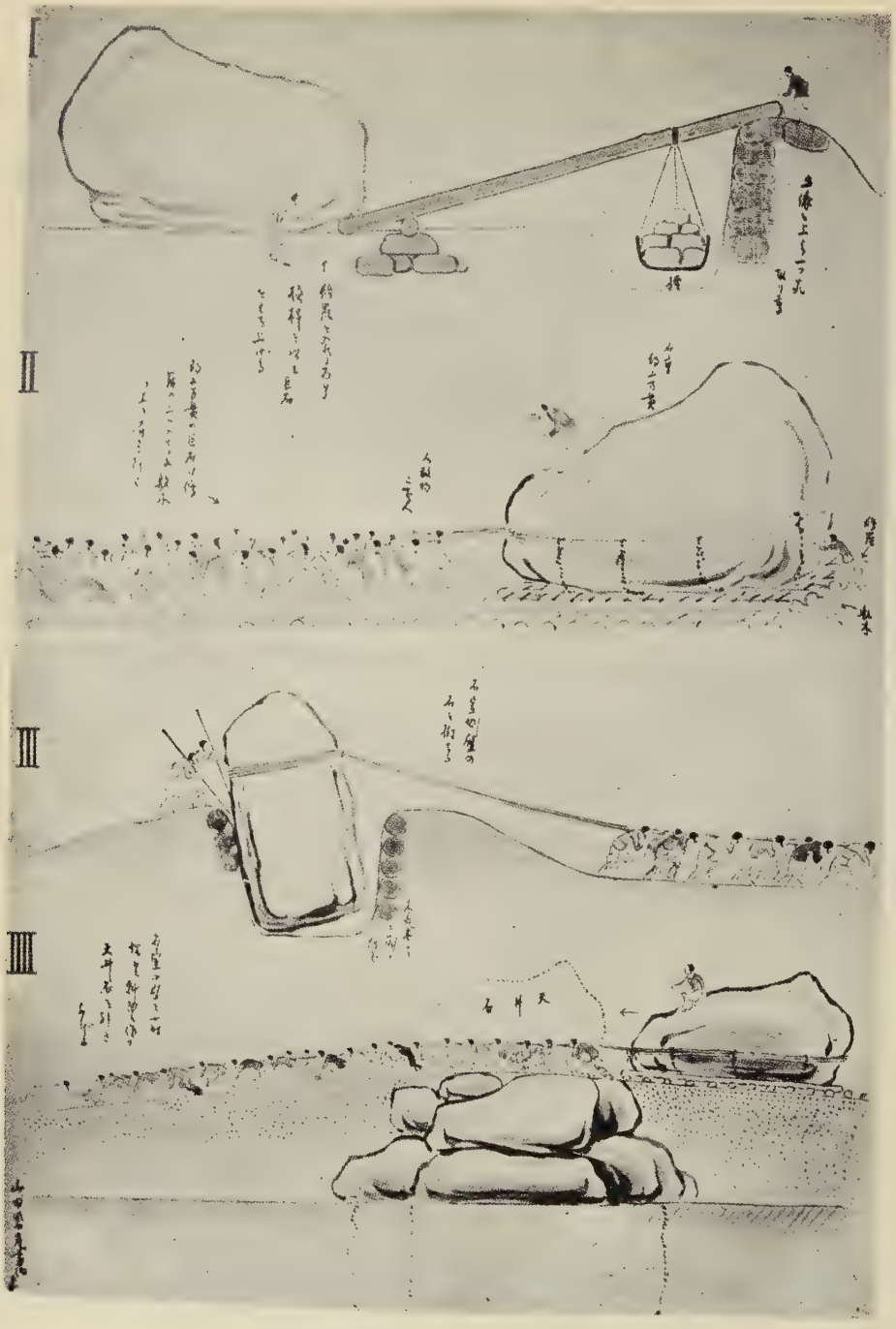
'We have received from Mr Philip H. Godsell, of Fort Garry, Winnipeg, an account of the finding of what are alleged to be Norse weapons and armour in northern Ontario. These relics were found at various times during the last three years on the mining claim of Mr James Dodds, north of the village of Beardmore, 125 miles northeast of Port Arthur. The finds were made by at least four men on various occasions, while " a university professor dug up part of a Viking sword in the same area last year ". According to Mr Dodds, his first find was made as far back as 24 May 1931, but attaching little importance to it, he left it for two years until its value was pointed out to him by Professor Burwash. They then agreed that nothing should be said about it until the articles had been submitted to the examination of competent authorities. The total find consists of a sword, a battle-axe, a shield handle, and pieces of rusted armour.

'Largely through the generosity of Mr Sigmund Samuel, all the relics have been secured for the Ontario Museum. They have now been photographed, and copies submitted to authorities on Norse archaeology in Europe. According to Dr Currelly, the Director, there is complete agreement that they are of one period, and are to be dated between

FIG. 1. BRONZE SHAFT-HOLE AXE OF SICILIAN TYPE, FROM THE BEACH NEAR HENGISTBURY HEAD
Length 4.9 in. (*See* p. 225)
British Museum

FIG. 2. BANK-BARROW CROSSING THE SCHLESWIG-ECKENFÖRDE ROAD
The rise in the hedge is where the bank-barrow passes through it. (*See* p. 230)
Ph. O. G. S. Crawford

facing p. 232



MEGALITHIC TOMB, ISHIBUTAI

drawn by Shiko Yamada (*see* p. 233)

Professor Takahashi's suggestion as to how the stones of the Ishibutai Dolmen were handled.

I, Raising great stone by means of radiating levers and weights, so as to get a sledge under it.

II, Stone being dragged upon the sledge.

III, Orthostat being set upright.

IV, Cap-stone being slid up an earthen bank into position.

FIG. 1. STONE GRAVE, MYSORE: SIDE VIEW OF CAIRN. (*See* p. 234)

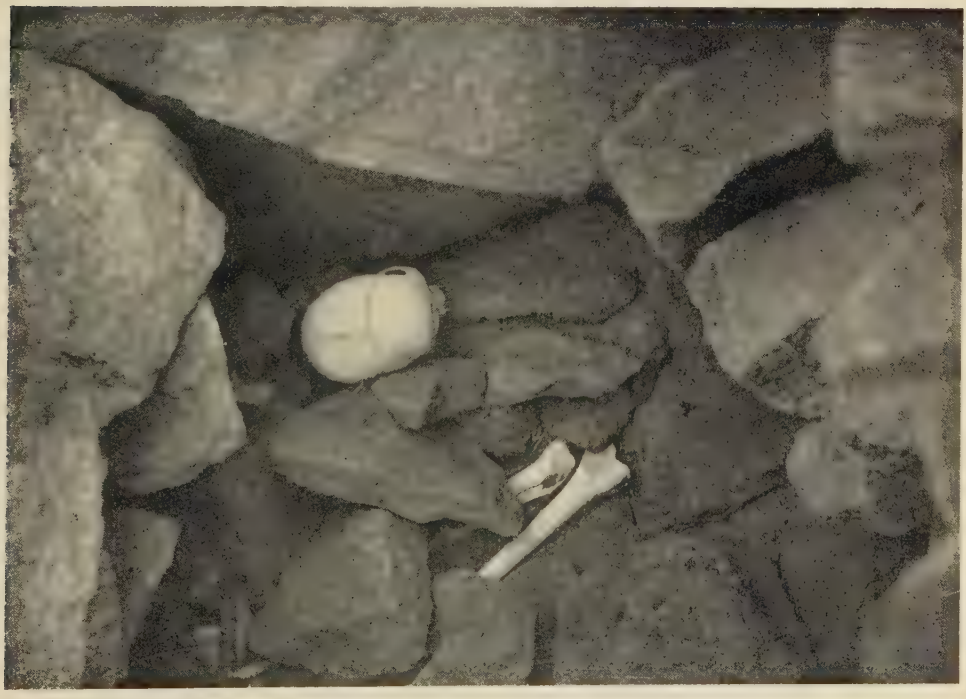


FIG. 2. STONE GRAVE, MYSORE: VIEW OF CHAMBER FROM ABOVE. (*See* p. 235)

PLATE IV

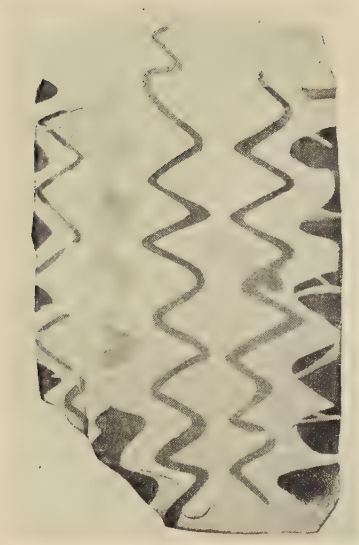


Fig. 1. PAINTING ON HEADSTONE OF A CHAMBERED TOMB, GANGAS DE ONIS, ASTURIAS, NORTH SPAIN

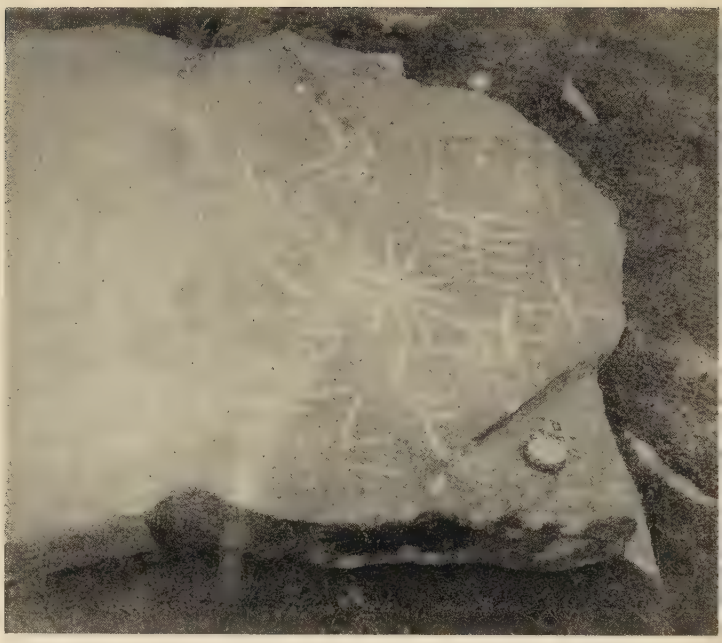


Fig. 2. ENGRAVED STONE, LOUGHCREW, IRELAND

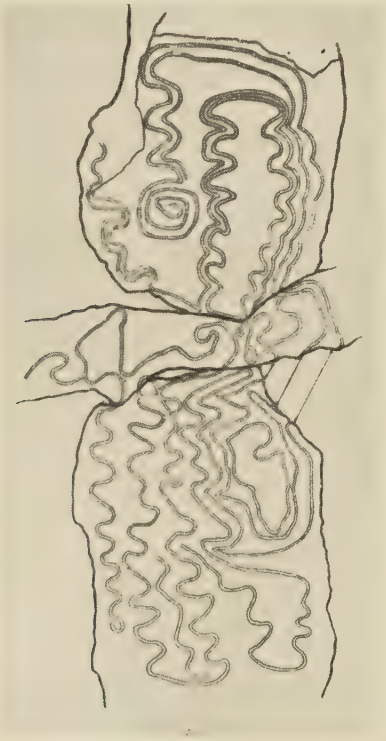


Fig. 3. ENGRAVED STONE, BRYN CELLI DDU, ANGLESEY

(See p. 2

A.D. 950 and 1000. Professor D. McArthur, Deputy Minister of Education, is preparing a report for submission to the Legislature.

The publication of this report will be awaited with much interest, for in view of the implications of the find it is of the highest importance that its authenticity or otherwise should be determined as soon as possible '.

MEGALITHIC TOMB, ISHIBUTAI* (PLATE II)

Ishibutai is a dolmen with a passage 11·59 m. long leading to a chamber 7·62 m. long, and 3·36 m. wide and 4·72 m. high. One of the roof stones is 5·42 m. long and weighs 77 metric tons. It has lost its mound, but the excavation revealed that this had been a square of 170 feet (51 m.) revetted with boulders : this was surrounded by a dry ditch 26 ft. (8 m.) wide and an outer bank 23 ft. (7 m.) wide, making the outer dimensions 300 Japanese feet—91 metres. There was no evidence as to the shape of the upper part of the mound ; it was probably a round barrow, possibly rising from a doubly terraced square.

The contents of the dolmen had long disappeared, but fragments of *Haji* and *Iwaibe* ware have suggested a date about the 7th century A.D. This agrees with the idea that this is the Momo-hara tomb in which Soga-no-U-ma-ko, who died in 626 and had a house at Shimanosho, was buried. In the middle of the 7th century the Emperor Kôtoku prohibited the building of great stone tombs because of the waste of labour they involved. The interest of all this for us is in the apparently independent existence of megalithic monuments at the other end of the world and their erection to the honour of historical persons. It makes us less inclined to link up outlying patches of megaliths with those of western Europe.

Professor Takahashi, an engineer, discusses the means whereby the stones were handled. (See PLATE II). His explanation of how the stones were transported and set up is : (I) lifting a big stone with a series of weighted levers radiating from it, so that the sledge to run on rollers can be slid under it ; (II) the stone being moved by man power ; (III) method of dropping an orthostat into its position ; (IV) method of dragging a cover stone into place. Drawn by Shiko Yamada. In the

* University of Kyoto, Department of Literature. *Report on Archaeological Research*, no. XIV. Hamada, Kosaku. ' The Megalithic Tomb Ishibutai at Shimanosho in the Province of Yamato '. 86 pp. Japanese text ; 15 pp. English summary ; 57 plates, 31 text figures. Kyoto, 1937.

text the leverage obtained by these methods as applied to a stone of 77 tons is exactly calculated ; this is not a fancy picture.

Professor Umehara adds a corpus of the other dolmens (fifteen) of Japan with good diagrams and some views and plans of the sixteen square barrows. But alas he does not transliterate the names in English, which should have been quite easy. ELLIS H. MINNS.

BURIALS IN MYSORE STATE (PLATE III)

The following report has been received from Colonel G. A. Beazeley, formerly Director of Surveys, Southern Circle :—

Between Tumbinkere of the Mandya Taluk (69th mile) and Hadisetti-halli of the Seringapatam Taluk (76th mile), the Bangalore-Mysore road passes through a hilly country with a number of stony heights. Here are the villages of Muddanahalli, Kadusettipura, Ganangur, Gaudhalli, etc. The people of these villages observe certain peculiar customs in the disposal of some classes of the dead. Normally corpses are buried in the earth by Vokkaligas, Adikarnatakas, Goldsmiths and other communities. But in some cases where the dead person was suffering from leprosy, lucoderma, consumption or puerperal complications the body is not buried in the earth. The villagers believe that it would be a sacrilege to bury such a body and that mother earth would not yield them crops if she was thus insulted. The villagers think that the natural elements refuse to absorb these bodies and in some cases the deceased body thus buried is exhumed and burnt. Usually such a person is conveyed after death to a neighbouring hillock and disposed of by what is known commonly in many parts of the Mysore State as ' Kallu seve ' or disposal by stones. The corpse is placed on the ground in a sitting posture close to a rock and smaller stones are placed upon each other to form a kind of wall enclosing the corpse in a small chamber (PLATE III, 1).

I examined about a dozen of these burials in the necropolis to the northeast of Muddanahalli hill, and about another dozen of them on a height known as ' Naragunji kallu bore ' near Ganangur. In some of the recent burials the skeletons were still partly in a sitting posture. I was informed that the last burial in the former place took place about six months ago and the last one in the latter place about two months ago.* In both the places even the bamboo biers used for carrying the corpses

* This was in 1935.

were lying near by. Part of a pillow was also found. In one of them tresses of long hair and some bones still covered with parts of skin could be seen through the hole in the top of the chamber. The place had still a foul smell. A shepherd boy informed me that the village goldsmith's mother was buried there three months ago.

This proves definitely that the custom is still current. None of the burials showed signs of considerable age. None of them could be identified as prehistoric. Many of them contained complete skulls, generally of women, and also other bodily bones like vertebrae, thigh bones, etc. (PLATE III, 2).

M. H. KRISHNA.
Director of Archaeological Researches, Mysore, 1935

MEGALITHIC PAINTINGS AND ENGRAVINGS (PLATE IV, FIGS. 1–3).

It is a long time since the suggestion was first made that the Megalithic culture spread up the Atlantic coasts of Europe from the South, and connexions between Spain and Ireland in very early times have been postulated. In the following note I merely wish to illustrate three pictures which seem to me to show a general similarity of design, and which can therefore be used as a further argument for this hypothesis.

The first is a painting on the headstone of a small chambered tomb at Gangas De Onis, a site in Asturias, North Spain. On the tumulus which covers the Megalithic tomb there has been built a Christian church, the Capilla de Santa Cruz. Some time ago the Conde de la Vega del Sella obtained permission to make a hole in the chancel and investigate the monument below. The painted headstone is reproduced by him in No. 22 of the Cómision de Investigaciones Paleontólogicas y Prehistóricas, Madrid, 1919. (FIG. 1).

The next comes from one of the ruined tumuli at Loughcrew, Ireland. The similarity with the Spanish finds is striking. (FIG. 2).

The third is the well-known engraved stone found buried in the centre of the mound at Bryn Celli Ddu, Anglesey, which was investigated and published by Mr Wilfrid Hemp. I cannot but feel that while the likeness is not quite so striking perhaps, there is a close similarity with both the Spanish and Irish examples. (FIG. 3).

M. C. BURKITT.

Reviews

THE DOCTRINE OF SURVIVALS, a chapter in the history of scientific method on the study of Man. *By* MARGARET T. HODGEN. *Allenson & Co.*, 1936. *pp.* 192. 5*s.*

To one who has lived through the greater part of the time under discussion, this book is of particular interest as it recalls the personality and contributions to science of many of the protagonists and the lively discussions at the meetings of various scientific bodies; but, at the same time, the book illustrates how much is missed when the great men of old are interpreted solely by their writings.

Professor Hodgen refers to the discussion in the sixties concerning the supposed degeneracy of savages on the one hand and the belief that they were merely laggards in progressive evolution on the other. Dr E. B. Tylor introduced the term 'survivals' to indicate those customs and beliefs in more advanced societies which he found to be vital in primitive communities, and thus he argued in favour of an evolution in civilization marked by the milestones of survivals which had no special functional relation with the civilization in which they are found. The work of Tylor re-enforced, but in another field, the stimulus given by Darwin to biology. Subsequently many students worked on similar or analogous lines of investigation in folklore, sociology, marriage and the family, comparative religion, and the like.

An analysis of the conceptions of L. H. Morgan in his *Systems of Consanguinity* and *Ancient Society* as compared with those of Tylor makes it clear that neither Morgan, nor McLennan in his books, anticipated Tylor in the formulation of a doctrine of survivals in the strict sense of the term. Andrew Lang worked largely in the fields of primitive religion and ritual, magic and mythology, and opposed Max Müller's philological explanations of the irrational elements in mythology, which he explained by the doctrine of survivals. The interests of G. Laurence Gomme were primarily historical, secondly evolutionary, and not at all psychological. He demonstrated what could be done with survivals in the reconstruction of the historical past and he regarded survivals as the arrest of the natural growth of ideas and practices due to the conquest of an indigenous and backward people by one more advanced. Impaired elements endured side by side with elements whose development had not been interrupted and he endeavoured to discover a relative chronology for such survivals.

The discussion of the origin of religion by Tylor and Robertson Smith ' was conducted against a background of parochial misinterpretation of primitive

man and fear of the impairment of orthodox faith by the use of anthropological data . . . Tylor's resolution of the conflict between polemical expediency and unencumbered inquiry was the theory of animism ' and he assumed that true religion precedes the religious act, but Robertson Smith ' asserted that religion is not essentially a system of ideas, but a body of fixed and traditional practices '. J. G. Frazer and R. R. Marett adhered to the ' conviction that religion is ultimately to be referred to psychology, to belief rather than ritual ', but both felt compelled to modify Tylor's theory of animism : Frazer to a pre-animistic stage of magic and Marett to ' a new category for religious rudiments of a non-animistic and emotional nature '.

Largely due to the enthusiasm of Jane E. Harrison ' Hellenists, following the procedure of the developmentalist, began to scrutinize them [the classics] as documents, and to employ them with other folk-lore materials as reflectors of " older and cruder ideas in petrifaction " '.

Professor Hodgen draws attention to the revival of doubt about the validity of the doctrine of survivals and her discussion of modern criticisms is of value. ' No effort has been made, until very recent years, to distinguish between those which might more properly have been considered parts of cultural stages later than the first savage condition. The insistent question, " what period, what state of society does the survival survive from ? " though frequently asked, has seldom been answered '.

The book is a well documented study of the genesis, growth in various directions, and even in the decay of a concept by a clear-sighted detached student. There are several misprints and, as might be expected, some statements open to question.

A. C. Haddon.

TOTEMICA, A SUPPLEMENT TO TOTEMISM AND EXOGAMY. *By* Sir James George Frazer. *Macmillan*, 1937. *pp.* xii, 518. 25*s*.

Sir James Frazer in the title of his last book describes the new work as a supplement to his previous monograph on Totemism. This exactly is what it is ; new data are provided, but there are no generalizations. Evidently Sir James has not found anything in the new material to cause him to modify the conclusions and hypotheses which he had expressed previously. Half the book is concerned with Totemism in Australia, ' the classical land of Totemism ' ; other parts of the world are dealt with briefly, some very much so, perhaps because the interest of observers has lain mainly in other directions.

Archaeologists will be interested in chapter vi, ' Totemic rock-paintings in West Australia ', in which Sir James gives the essential information ; but no mention is made of rock-paintings in other parts of Australia, presumably because they have not been equated definitely with Totemism. Professor Elkin is

quoted as stating, ' all we can say is that the function of the wondjina paintings is to ensure the regular recurrence of the wet season, the normal increase of edible animals and plants and possibly also of useful objects like ochre, the influence of the sun, and the availability of the supply of spirit-children . . . The efficacy of the special paintings is associated with the fact that they are *Ungud*, that is, belong to the far-past creature time. Preservation of continuity with this period is essential for present prosperity '.

Sir James naturally alludes to the analogy which may be traced between these paintings and those prehistoric paintings in southern France and northern Spain, and he subscribes to Salomon Reinach's theory, ' that the paintings were designed to secure success in the chase of edible animals by means of sympathetic or imitative magic '.

It is needless to add that the book is written with the clarity to which Sir James has accustomed us and that the data are scrupulously documented.

A. C. Haddon.

SCANDINAVIAN ARCHAEOLOGY. *By* H. Shetelig *and* H. Falk. *Clarendon Press*, 1937. *pp.* 458, 62 *plates*, 33 *text-figures*. 18*s*.

The work of two distinguished authors, each a master in his chosen field, this book should appeal to archaeologists and students of words alike. The archaeological chapters by Dr Haakon Shetelig, whose studies are well known to English and Continental readers, occupy nearly three-quarters of the book. They cover the whole field of Scandinavian archaeology from the retreat of the ice-sheets and the earliest settling of man to the far-flung exploits of the Vikings. The arrangement is mainly chronological, but this has not been rigidly adhered to, several important subjects being covered in separate chapters. Among these may be noted one on the subject of the Bronze Age rock-engravings, another of great fascination and insight dealing with the whole subject of runes, and a third describing the decorative art-styles of the Iron Age between 450 and 1100. The treatment of the archaeological chapters is largely descriptive, the rich material available being on the whole well displayed without an over-elaboration of technical detail. The conservative tendency and the concentration upon established facts is probably all to the good. The descriptive matter is well supported by the half-tone plates and a certain number of line-drawings. A serious omission, which must be mentioned, is the lack of maps, the provision of which would have made clearer the sometimes complex relationships of the various parts of Scandinavia with the outside world at different periods of time. The bibliographical foot-notes supplied at the bottom of the pages will be found adequate to afford the reader an introduction to the more important sources.

The closing chapters of the book, dealing with broad aspects of life in Scandinavia in early times—subsistence, dwellings, costume, seafaring, weapons and religions—are from the pen of the late Professor Hjalmar Falk, joint author of the standard works on Norse etymology and master of a wide and exact knowledge of early Norse literature. In writing these chapters Falk was, in effect, summarizing a series of his own monographs, so that it has been possible to omit bibliographical references. By piecing together the social and cultural implications of the history of words and their use Falk has succeeded to a remarkable degree in making real and vivid the life of the past as it was really lived.

What makes the book of unique interest is the way in which two different and distinct approaches converge to give a unified and lively conception of the way men lived in the distant past. From the point of view of the archaeologist in particular the later chapters are important, if for no other reason than that they accentuate the limitations to a full understanding of human societies of the past inherent in purely archaeological material. To visualize what we should know of the Vikings, for example, without the runes and the sagas is a first step towards realizing how little we know of the megalith-builders or the folk who made the Bronze Age rock-engravings of Bohuslän. J. G. D. Clark.

SCHIPENITZ: Kunst und Geräte eines Neolithischen Dorfes. *By* Oleh Kandyba. *Vienna: Anton Schroll; Leipzig: H. Keller*, 1937. *pp.* 156 *with* 574 *figs.* 24 marks.

A fully integrated survey of the 'Neolithic' Painted Pottery cultures of southeast Europe, when it comes to be written, will bring about an immense advance in our understanding of prehistory. Meanwhile studies of individual sites and regional groupings must prepare the way, and few of them are likely to be more useful than this new study of the long-familiar site of Schipenitz. The place lies on the left bank of the Pruth, 15 km. northwest of Czernowitz in the Bukovina, which, while geographically continuous with the Ukraine, used to be the most easterly territory of the Austro-Hungarian Empire. Thus most of the material from the excavations (1893–1914) went to the Naturhistorisches Museum at Vienna. There was unhappily little scientific control in the field, and though we hear of large pit-dwellings, hut-sites (one quadrangular) with traces of fire, and a potter's kiln, proper planning and stratification are to seek, and the material, mainly pottery, has to be studied on its own merits and in the light of comparisons with related sites elsewhere. The first to undertake this was Prof. Gordon Childe, whose paper of 1923 (*J. R. Anthrop. Inst.* liii, 263–288) is the chief landmark on the way to the present work.

Dr Kandyba, from his seat of vantage in Prague, is anxious to interpret to West European readers the Polish and Ukrainian sources of much of the

essential comparative material, in due relation to the better known archaeology of the Danubian countries. He thus very properly first stresses the basic unity of the ' Bandkeramik ' area—from Bohemia to the Dniepr, with its outliers as far south as Thessaly—wherein Painted Pottery simply becomes a more and more prominent element as one travels south-eastward. For those inclined to consider it primarily from the Near Eastern point of view, as a self-contained phenomenon tempting direct comparison with Tell Halaf, Susa, or Anau, it will be especially instructive to consider it in this light, together with, for instance, the distribution of the wholly European ' shoe-last celt ', or plano-convex stone hoe. The author offers a fivefold chronology for the Ukrainian (or Tripolye) culture. A1 (Nezvýska) begins with linear-incised and pitted ware, answering to ' Danubian 1 ', as well as Painted ; A2 (Zališčyky) comprises Schipenitz A ; the ' transitional ' Horodnycja phase is largely represented by a gap between this and Schipenitz B, which begins little before the main B1 or Bilče Ukrainian phase, and only just lasts into the final B2 or Košylivci. It is Schipenitz B which provides the great bulk of the site's painted ware, and the excellent drawings in line and wash provide (though in monochrome) a first-class repertory of the marvellous designs, which should be of the highest interest to students of abstract art today. Their evolution is traced in close connexion with the form-typology, which is also clearly and fully illustrated. The coarse ' C ' pottery, with its rough surface and comb decoration, should take its place in any consideration of the relations between the Ukrainian cultivators and the more primitive forest-dwellers to the north of them. The well-known figurines, as well as the stone, flint, bone, and horn implements, are adequately treated. Metal is virtually, or totally, absent.

The book ends with a brief summary and a comparative table but absolute chronology is not attempted. With its 574 illustrations one would yet have welcomed one coloured plate ; it is hardly fair to leave the reader's colour-sense alone ungratified where colour is so predominant in the material presented. But it remains a credit to both publishers and author, and to the editor of the series in which it appears, Prof. Oswald Menghin, and it is a great pity that its price is not more accommodating. CHRISTOPHER HAWKES.

DIE MITTLERE BRONZEZEIT IN ÖSTERREICH. *By* KURT WILLVONSEDER. *Vienna : Anton Schroll ; Leipzig : H. Keller*, 1937. 2 *vols.*, *pp.* 482, 10 *text-figs.*, 56 *plates*, 1 *folding map*. 36 MARKS.

This two-volume study of the Middle Bronze Age in Austria also forms part of Prof. Menghin's series, and to its admirable format the same appreciation applies : ' 2 vols. ' has a ponderous air, but Dr Willvonseder's pair, though not inexpensive, are each of compact and convenient size, and their separation

facilitates reading, since the first comprises the main text, the second the catalogues of sites and finds, bibliography, and plates, and one can thus keep two places open at once. The subject is important both in space and time. Present-day Austria, with its western provinces connected naturally with south Germany, its eastern with Slovakia and Hungary, lies astride a cultural frontier which has shown its significance in almost all ages of European history. And the elements of the Middle Bronze Age, in Central Europe as in Britain, reward analysis by displaying an equilibrium between Early Bronze Age incomings and Neolithic survivals, which is perhaps the most vital fact about the passage from the earlier to the later prehistoric phases. Dr Willvonseder deserves great praise for his handling of these opportunities. He shows that in western Austria, as in south Germany, the Early Bronze Age (Reinecke's A) included the survival of both the Pile-dwelling and the Corded-ware cultures of the Late Neolithic, while in eastern Austria he defines a number of distinct groups outside the classical Aunjetitz area north of the Danube : Wieselburg (Childe's Gata), Mad'arovce (Childe's Veselé), the Baden culture continuing from the Late Neolithic, a *Litzenkeramik* group with a probable Corded-ware origin, and a Böheimkirchen culture in which Neolithic Laibach and Bell-beaker elements were combined under Aunjetitz influence. The culmination of the last-named is seen in the A2 (not B) inhumations of Gemeinlebarn (where the cremations belong to C, and the famous fibula to the Urnfield period D : there are no ' Aunjetitz fibulae'). Thus the Middle Bronze Age does not start from any uniform Aunjetitz ' continuum ' : its basis is the fusion of Late Neolithic elements, in various groups, with Early Bronze Age influences, not only from Aunjetitz, but in the west also from south Germany, in the east from Slovakia and Hungary (the latter of course manifest especially in the bronzes). This demonstration is carried through largely by a careful analysis of pottery, and for pottery and bronzes alike the main framework of the book is provided by exhaustive typological and comparative study embracing every object of the Middle Bronze Age periods B and C known from Austrian soil.

The result is the recognition of two provinces of Middle Bronze Age culture, each founded on the basis just described : the western is one with that of South Bavaria, the eastern with that of Slovakia and West Hungary. The Salzburg copper-mines were at work as early as A2 and B : settlements, often lamented as absent in this period, are quite plentiful (though unhappily no plans are reproduced here) ; and lastly the typical sepulchre is of course the barrow, in virtue of which these provinces take their place in the greater unity of the ' Tumulus Bronze Culture ' of Central Europe generally. The West Austrian barrows, Bavarian in type, are derived from the Corded-ware barrow tradition present in south Germany : the eastern must have a parallel origin of their own,

but this is less adequately traced, since we are not told enough about the relevant Corded-ware people of south Moravia, and about the analogous *Litzenkeramiker* of Lower Austria too little is yet known. In the ensuing Late Bronze Age, barrows vanish before the incoming Urnfield peoples, but pottery shows that the older population remained in part at least to be absorbed, the western into the Knoviz group, the eastern into the true Lausitz.

The inspiration of Reinecke, manifest throughout the book, is well shown in the absolute chronology—viz. Period B begins 1500–1450 B.C., Period C 1250. There is some justification for these figures, but for the short life assigned to C—only 50 years—we are not given enough, especially as it is usual to equate this with two-thirds of the whole North-European Period II (Müller 3 and 4). However, this is not a major point in assessing the book as a whole, and it is safe to say that it will be widely valued. How much one would like to have the Austrian Hallstatt Period similarly treated ! CHRISTOPHER HAWKES.

THE QUATERNARY ICE AGE. *By* W. B. WRIGHT. *Macmillan*, second edition, 1937. *pp.* XXV, 478, 23 *plates and* 155 *text-figures*. 25*s*.

The second edition of this standard work has been eagerly awaited since the first went out of print. It is a tribute to the author that the first edition was out of print rather than out of date, and it remains today, in the reviewer's opinion, a first-class and sound introduction to the subject for the serious student, who may then proceed to the second. If the original was a text-book the revised version is, to some extent, a book of reference of carefully chosen and considered information, with selected lists of references inserted here and there.

The general scheme and the plates are similar, but in addition to revision, four new chapters have been added on glacial retreat, the older and newer drifts of the British Isles, the river gravels of the south of England. Within a few pages the two editions are the same size, the use of smaller type has allowed of an increase of about 25 per cent. in the letterpress.

In general Dr Wright has restricted himself to the same regions of the world, and has skilfully avoided thereby some vexed and unsatisfactory questions, the treatment of which might have rendered his book obsolete before it was published. More than that, he studiously avoids the unqualified acceptance of startling or sweeping theories or conclusions : experience shows that many of these do not last long. The book is essentially what it claims to be, a second edition, not a new book ; but it takes note of nearly 25 years of rapid progress and discovery. Experts will probably disagree with some passages—for example, speculation on the quaternary history of the Mediterranean ; some chapters and lists of references might have been even more fully revised ; but are experts ever satisfied ? Specialists will look for some things in vain, or

be pained because some of their pet theories may be ignored, but they will find in their place a great deal that will be new to them and some very serious food for thought : others will find much that has seemed difficult or obscure clearly and precisely explained.

This publication is a Book of Common Sense, a mine of information, to be recommended especially to archaeologists. K. S. SANDFORD.

LES HITTITES. *By* LOUIS DELAPORTE. *Paris : La Renaissance du Livre, 94 rue d'Alésia. pp.* 371, 34 *text-figures*, 3 *maps*, 4 *plates.* 40 *frs.*

This volume is no. 8b. in the French series ' L'evolution de l'Humanité ', and aims at presenting a popular account of the Hittites, as far as modern knowledge permits. It is divided into four sections which cover the geography of the Hittite lands and the history of the Hittites ; institutions ; religion, art and language ; the Neo-Hittites.

An introduction gives a sketch of Hittite archaeology, to the commencement of the excavations at Alaca Huyuk in 1935.

The appearance of this work is opportune when it is considered as a popular text-book, but students of the subject will realize that a solid foundation will be laid only with the final publication of the Bogazkoy material. Nevertheless the advance in Hittite studies in recent years has been significant.

The treatment of the geography of Asia Minor and North Syria is adequate, but adds nothing to the work of Prof. Garstang, whose account of the same subject will be preferable for a fuller understanding of the physical conditions, for which the maps in this publication are totally inadequate.

The history has been compiled to all extent and purpose from literary and epigraphic sources alone. The attempt to make the course of events intelligible is cautious, although naturally some conclusions will not meet with universal acceptance—*e.g.* the date of the Cappadocian tablets (p. 45–6). The outline of the prehistoric archaeology is too brief, and not enough distinction is made between the several cultural complexes of Anatolia, for which Bittel's *Prähistorische Forschung* offers a basis. It is unfortunate that the author was unable to utilize the exceptionally rich finds from Alaca Huyuk to present a more emphatic view of the wealth of pre-Hittite Asia Minor. The history of the Old Empire is obscure and disconnected, but less so than a few years ago. Firmer ground is reached with the New Empire, which is dealt with at some length. The identification of the contemporary geographical and ethnological names is discussed with care, though we note that M. Delaporte equates Alasija with Cyprus (p. 167).

The section on Institutions is of interest especially as regards comparisons with Egypt. When dealing with religion more use could have been made of

archaeology to fill in a view of the earlier cults, which probably outlasted the Hittite domination. The survey of the arts and crafts is rather sketchy, especially in the provinces of metal work and pottery. M. Delaporte stresses the essential continuity of the ceramic traditions of Central Anatolia, but draws no inferences from this. The complexity of the philological problems connected with the Bogazkoy texts is explained and notes on the component languages are given.

The survey of the Neo-Hittites is short as the author does not consider that these later states can be considered as Hittite in an ethnological sense.

The text-figures are not of great use, and plates 2 and 3 are not enlightening. There is a full bibliography. Turkish place-names are gallicized throughout, despite the approximate official standardization now in use. J. R. STEWART.

PAESTAN POTTERY. *By* A. D. TRENDALL. *Published by the British School at Rome* (*Macmillan*, 1936). *pp.* 141, 65 *half-tone figures and* 36 *collotype plates.*

It is a good general rule, though often broken, that a reviewer should avoid a subject of which he is completely ignorant. Yet there are reasons why in this case the rule may be broken. This is principally because certain things need to be said which will never be said by those heavy-weights who contend in the pages of some Journal or Zeitschrift or Revue. So I may welcome as a Θεῖα τύχη the chance which brings *Paestan Pottery* to my table.

In the first place the book is notable as a product of the British School at Rome. For this reason, if no other, it would have a bibliographical value of its own ; but it is most gratifying to see how fully it maintains the very high traditions of the institution. Outside the circle of subscribers to whom he immediately addresses himself Mr Trendall deserves to find many readers. The appearance of his work is very timely, for the British School at Rome has been in heavy weather. If, as seems likely, it is obliged to appeal to the generosity of the public, then it is well that the Archaeological Faculty should be able to point to such incontrovertible proofs of its usefulness. There is another, and very important matter which must be emphasized in connexion with the School. Mr Trendall held his post as Rome scholar for two whole years ; and it is clear that no shorter period would have sufficed for a study of such range and depth. But unfortunately his case is exceptional. Owing to the dwindling value of grants and scholarships the practice has arisen of sending students for only a few weeks or months to Italy. The result is that only a very few produce published work of any importance. It is not the fault of the students, who show no lack of interest or industry. But it ought to be axiomatic that small grants produce only small results. Our colleges and learned institutions must see to it that the young archaeologists are given sufficient funds to pass the greater part

of two years in Italy. Be it noted in passing that the American Academy in Rome is faced with similar difficulties and suffers, if a little less acutely, from the same malady.

Now for the book itself. The first thing that will appeal to any experienced eye is the technical excellence of its production. In a thin volume of little more than large octavo form are included 36 full plates and 65 half-tone figures as well as 140 pages of text. And yet it weighs no more in the hand than many a trumpery novel brought out by a second-rate publisher. This is a real triumph, obtained by the careful choice and utilization of paper suitable for each class of subject. The printing also is a pleasure to the eye. No doubt it has all been a labour of love on the part of Messrs. Macmillan, but an author also has much to do with the presentation of his own material, and it is clear that this author has little left to learn in the often neglected art of book-production. As his present study is only a prelude to a larger history of the Greek pottery of southern Italy we may look forward to a magnificent book in the near future.

In the preface it is stated that ' the problem of south Italian pottery is still a rather confused one '. ' The present work represents an attempt to put into order one of its more closely defined fabrics, that of Paestum '. In the last chapter there is a catalogue of all the known vases, and this is accompanied by a register of the museums in which they occur. Many of them are at places so distant as Amsterdam, Berlin, Boston, Brussels, Copenhagen, Geneva, Leningrad, London, Madrid, Paris, Vienna. In Italy no less than 70 are at Naples, 13 at Paestum, 12 in the Vatican, not to speak of smaller collections. They were discovered at sites all over south Italy, but most thickly round Naples from Teano to Velia. It has often been suggested that Tarentum was the place of manufacture, but Mr Trendall argues convincingly for Paestum The periods and the individual artists are discussed in a careful essay of about 100 pages. In these the reader will make the acquaintance, probably for the first time, with two graceful and ingenious painters named Asteas and Python.

DAVID RANDALL-MACIVER.

BULLETTINO DELLA COMMISSIONE ARCHEOLOGICA COMUNALE DI ROMA. Years 62 and 63. *pp.* 195 *and* 135 ; 144 *and* 76 *with many illustrations.*

This venerable serial continues to be admirably edited. With it is now combined the Bulletin of the Museo dell' Impero Romano. The two volumes contain numerous articles of much interest for the lover of Rome and the classical archaeologist. A valuable feature is the list of notices of work done in regions outside Italy.

ANTIQUITY

The year 1934 (vol. 62) is notable in particular for three articles, dealing respectively with the Ara Pacis, the Arch of Titus, and the Saepta Julia. The first of these is by G. Monaco. It is a study in the iconography of the fragments unfortunately scattered between the three collections of the Museo Terme and Villa Medici at Rome and the Uffizi at Florence. Recognizing that one group of personages represents the family of Augustus, a second the family of Drusus and a third the family of the Ahenobarbi the writer concludes that all except Livia and Lucius Caesar have been identified.

The Arch of Titus in the Forum at Rome is described by K. Lehmann-Hartleben in an article devoted principally to the reliefs. He discusses their style and treatment of the scenes with much learning and some originality. It is a treatment that will be stimulating and interesting to those already familiar with the works of Wickhoff and of Strong. How far and in what sense Roman art may be described as simply ' realistic ' is always a good theme. The suggestion that the arch may have been intended for a sepulchral monument is novel and startling ; it is well argued.

The ' Saepta Julia ' and the ' Porticus Aemilia ' were situated in the Campus Martius. Various remains of them have been brought to light in the recent extensive excavations. G. Gatti compares the results of these excavations with the information furnished by the ' Forma Severiana '. Two very useful plans illustrate his argument.

The year 1935 (vol. 63) besides several attractive minor articles on statuary and sarcophagi continues one of unique interest and importance on the stratum underlying the Roman Fora. It is written by G. De Angelis d'Ossat, and in the space of 34 pages accompanied by photographs and sections conveys an astonishing amount of information which has never before been published in an accessible form. The summary on pp. 31-34 should be incorporated in every future history of Rome ; it gives the geological and palaeontological history in nine periods. These may be roughly indicated as (1) *Maremman*, immediately succeeding quaternary ocean ; (2) the most ancient tufa ; (3) volcanic explosions bringing two kinds of *pozzolana* ; (4) formation of a stream-system ; (5) period of great eruptions, forming a sheet of tufa ; (6) the second period of erosion and stream-formation ; (7) an important rise in whole ground-level, the Tiber now appears as an important stream ; (8) deepening of the stream-system ; the contours of the ground begin to assume their present form ; (9) arrival of prehistoric man, who settles first on the Palatine and Capitoline hills.

The whole subject is illustrated by drawings and by photographs of the fossils, amongst which *Elephas antiquus* holds the place of honour.

DAVID RANDALL-MACIVER.

ARCHAEOLOGIA SINICA, published by the *Academia Sinica*, Institute of Philology and History, Nanking. Folio Series, Number One. CH'ÊNG-TZŬ-YAI, a report of excavations of the Proto-historic Site at Ch'êng-tzŭ-yai, Li-ch'êng Hsien, Shantung. *By* LI CHI, LIANG SSŬ-YUNG *and others*. *Nanking*, 1934 (*published in* 1935). *pp.* XXVIII, 105 *in Chinese*, *pp.* XII, 30 *in English*, 54 *plates and coloured frontispiece*, 34 *figures and tables in text*. £2 14*s*.

The appearance of this work is a great event. It is the first Chinese archaeological publication produced after the western manner, showing the application of western archaeological technique and furnished with an English summary. Its editor, Li Chi, a Doctor of Harvard and Research Professor of Archaeology in the Academia Sinica, was lately in this country lecturing in various Universities. The Institute has been excavating the site at An-yang since 1928 and Li Chi has issued four preliminary reports in Chinese, but the full-dress publication of this great enterprise must await its completion : Ch'êng-tzŭ-yai being a smaller self-contained undertaking, carried out in 1931 and 1932, has been chosen as the first subject to be published exhaustively.

Ch'êng-tzŭ-yai (City-wall cliff) is in northern Shantung, about 17 miles east of the capital Li-ch'êng (or Tsinan) and about 80 miles from the sea. It was an oblong city 450 by 390 m. with mud walls still 3 m. high, once perhaps 6 m. high and 9 m. thick. Under the surface-soil was a barren layer of hard yellow earth thinning out from the walls to the centre and certainly derived from the degradation of the walls : below this a layer 2 or 3 m. thick of greyish yellow earth and then the virgin soil. This greyish yellow deposit has running through the middle of it a thin layer of silt : this is very important as it marks a period when the site was deserted for a while and definitely separates two cultures distinguished by their pottery.

The pottery was the main thing, as no remains of buildings could be defined and the stone artifacts offer nothing special : the pottery was about half and half hand-made and wheel-made, the latter slightly preponderating in the upper layer. About a quarter of the hand-made pots bear mat impressions upon them ; other pieces bear lines and ribs made upon the wheel. There is but little decoration, triangles and hatchings, a complete contrast to the famous painted wares.

In the upper stratum (Ch'êng-tzŭ-yai II) pottery is mostly grey and kilns were found in which it was baked apparently out of clay filched from the wall. This layer belongs to a time when bronze and writing were known though very little was found, just a few numbers and marks and one rather pleasing inscription. ' A man from Ch'i has netted six small fish and one tortoise '. This upper settlement has been identified with the capital of the small state of T'an which flourished *c.* 1200 to 684 B.C.

In the lower stratum (Ch'êng-tzŭ-yai 1) the pottery was mostly of a very fine black, sometimes not more than a millimetre in thickness, and beautifully made : a little was hard white ware rather like porcelain body, a good deal of salmon-pink shading into red and some slate-colour. The black ware has been named after the site and will be famous as marking the link between the neolithic age and the Shang : it is occurring under the Shang culture at An-yang. Then we have the very important type of the *li* or hollow-legged tripod with its derivatives the *hsien* and *kuei* (like Giles 6423 + $\sqrt{\ }$ *li*) continuous from early neolithic to full Chinese culture. Finally there are oracle-bones, but uninscribed, an earlier stage of those so famous at An-yang. All this shows that here is our earliest real Chinese city, contemporary with the Hsia Dynasty, and lasting from say 2000 to 1300 B.C.

The book is admirably produced and vies with the Japanese publications : while grateful for the English summary by Liang Ssŭ-yung, and for the proper names, such a difficulty in Chinese, being clearly distinguished, I must make my usual plea that English underlines should be added to the plates, maps and text-figures in future numbers of the series. Of some tables in the text I could make neither head nor tail. I believe that people brought up on the beautiful Chinese characters cannot bear to spoil a page with discordant Latin letters.

ELLIS H. MINNS.

WITH A SPADE ON STANE STREET. *By* S. E. WINBOLT. *Methuen*, 1937. *pp.* 1–240, 12 *plates and* 36 *figs.*, *folding map.* 10*s* 6*d.*

The title of this book indicates in what respect it is intended to supplement Mr Belloc's well-known work. The author has set out to answer various outstanding questions in regard to the course of this famous road. It is evident that at many points he has been highly successful, as, for example, at Hardham (64), Alfoldean (92), Okewood (104–110), Juniper Hall (138), Mickleham Down (144) and Ewell (154). Equally, there are many other places to which attention might have been extended ; and '*vita brevis*' no doubt supplies the answer to why this moment was chosen for publication. In view of the title, it may nevertheless occasion surprise that there is no adequate illustration of road-sections or other structural features which the spade revealed. For, apart from its general construction, the road exhibits some highly interesting special features, such as the cuttings and embankments, which would reward a systematic use of the spade with first-class details of Roman road-building in Britain.

More open to criticism is the handling of the archaeological evidence. While the road itself has yielded, in and below its metalling, sealed deposits indicative of its date, the author chooses rather to date the road by dissociated finds made near its course. This fallacious method, too commonly used in

descriptions of Roman roads, could be employed in just the same way to assign our principal railways to the Roman age.

The general description, vivid and refreshingly interesting, prompts in parts some questions. How many routes of the Imperial age were called after anyone but the Emperor ? Did *mancipes* police a road ? Did not road-repairs devolve upon the local *civitates* ? Rollers (*cylindri*) were known and used in the Roman world, both for agriculture and engineering. Again, is it not worth noting, as an argument for the early existence of the direct route between London and Chichester, that Ptolemy (i, 15, 6) knew its length and based an argument upon it. Readers will form their own opinion on the appendix dealing with Roman Ewell. It is attached to a valuable record of local discoveries : but the statement that the ' home of man for nearly nineteen centuries is not likely to preserve its Roman boundary banks ' is belied by the topography of nearly all our smaller Romano-British towns. I. A. RICHMOND.

THE WORLD OF HESIOD : a study of the Greek Middle Ages, *c.* 900–700 B.C. *By* ANDREW ROBERT BURN. *pp.* XV, 263. *Kegan Paul*, 1936. 12*s* 6*d*.

Mr Burn has set himself the most difficult task of all in this second book of his projected trilogy on early Greece. His first book *Minoans, Philistines and Greeks* showed that he was a scholar of distinction, with a free and unconventional mind. In this book he shows how essential for the study of a period such as the Greek Dark Ages, is a highly critical use and selection of the archaeological material. Mr Burn is another recruit to the new school of Greek historians who go to the archaeologist for advice and help.

The author could not have found a more obscure field of research than those Dark Ages which he calls (rightly or wrongly) the Age of Hesiod. Personally I am no believer in the 9th century date of Hesiod. I can see no reason to date him earlier than 700. For the proposed astronomical date suggested by the famous reference to Arcturus seems to be offset by the specific mention of the festival of Amphidamas of Chalkis, the date of which we know. Mr Burn slurs over this difficulty. But the date of Hesiod does not seriously matter, for whether he comes at the beginning or at the end of the Geometric period does not disturb the issue. The main point is that Hesiod is the only mouthpiece of the age, who faithfully represents, in a good literary medium, a period of which history is almost silent. It is as if we had a Sidonius in the seventh century A.D.

The age of Hesiod was, as Mr Burn shows, an age when the whole social structure and economic organization had changed. Cnossos had grown up in Crete into such a centralized power that its accumulation of wealth and control made it exceedingly vulnerable. While the Middle Minoan periods had been

characteristic of Crete as a whole, with priest-kings at many places in the island, the Late Minoan periods led to the growth of what is generally called a Palace Style. This is more than a mere archaeological classification. It meant also a Palace Rule and with it the danger of collapse. Minoan society, the author points out, had reached a stage ' when it was particularly vulnerable to one blow . . . very much as in Karl Marx's vision of the nemesis of modern capitalism '. The blow, as we know, fell and Crete faded away. There followed a Heroic Age, here defined as one ' in which barbarians have taken possession of a higher civilization and are breaking it up '. The accumulated capital of the Minoan world was dissipated in adventure that was economically futile and in splendour that was unproductive. Then comes the Dorian crash and the heroes vanish. The world is standardized on a still lower level. Everywhere we find a ' subdued and defensive mentality, prepared to forego vainglory for the sake of protection '. This is the age of Hesiod.

But the Dark Ages of Greece differ from all other Dark Ages in that the Greek outlook saved them from squalor. Homer, who represents the beginning of the period to some large extent, even if his heroes belong to the close of the Age of Vainglory, still, by his depiction of the gods and of Olympus, made men think, and so ' broke the chrysalis of early Greek piety, so that Greek thought spread its butterfly wings '. For Homer did not worry over religion and sought no consolation in other worlds. And Hesiod is his true successor, for even if he mentions magic and talks superstition he does not panic about it at all, and his main task is to tell men to get on with their work. He is as much a humanist as Homer. It was the Greek success that made them ask, when faced with the mumbo-jumbo of the magician, ' Does this practice *really* do good ? is this belief *really* true ? ' And in these questions lies the genesis of science.

Mr Burn devotes much space to all those things that Greeks of this age had both in and on their minds. ' With the breaking up of every conspicuous aggregation of wealth ', says the author, ' and with the wholesale slaughter among the lords and heroes themselves, we need not be surprised to find many old magical rites and usages creeping back out of dark corners '. All this—and its cure—are reflected in the lines of Hesiod. But Mr Burn gives us all the horrid detail of Greek superstition, of the human sacrifice probably continued even in Periclean Athens, of the *akroteriasmos*—the severing of the limbs of the dead to prevent them from walking (for an instance compare the recently opened long barrow burial at Maiden Castle) and a host of horrors. This is all to the good, and beneficial to those who think in terms of ' Legacies of the Greeks to Us '. There was a very dark side to Greece in every age. But its darkness was always illumined by some shining streak of pure rationalism.

Mr Burn, having analysed the character of the Dark Age of Greece by

showing in detail its addiction to magic and the parallel expurgation of magic that developed, gives us a very clear and balanced study of Greek outlook on sex and the nature of family life, of primitive law and custom. He concludes with a carefully documented account of a chosen number of Greek city states, described at that moment when they were on the point of emerging from the Dark Ages to the Renaissance of the seventh and perhaps late eighth centuries. He discusses the origin of coinage, and emphasizes the importance of proto-coinage ; he discusses the horse and its uses, and makes a new and interesting point when he calls attention to the exaggerated ways in which the horse is delineated in Geometric art—exaggerated because it was a novelty. He gives us the almost unknown story of Ardys and Kerses of Lydia, one of the best of all ancient tales of adventure, he mentions the forgotten Hymn to Delian Apollo by Eumelus, and reminds us of the high qualities of Thebans—' they formed a virile and vigorous community with a strong grip on life. At Thebes suicides were held in the deepest dishonour and infanticide was forbidden '. He wisely adopts the Temese-Tamassos solution of a familiar Homeric historical crux, and concludes with a sound summary of those recent historico-archaeological researches which have shown how preliminary trade in the Geometric Age led the way to later Greek colonists.

Mr Burn's book is a notable achievement and should be read by every student of Greece. He warns us, in effect, to get back to our reliable archaeological sources, assured by the tolerable certainty that they alone can tell us what in fact *did* happen as contrasted with what might have happened. Historians, and Mr Burn is a historian, have long needed this discipline. It is, consequently, refreshing to read that ' Plato is on most matters excellent evidence for what the ordinary Athenian did not think '.

The following criticisms are offered, pp. 126–130 : there is a conflict of view : it is on p. 126 suggested that homosexuality, which first developed in Greece in the Dark Ages, may have come from Egypt and Crete, but on p. 130 he maintains the view that it was introduced by the immigrant ' Aryan ' Greeks to a Mediterranean not addicted to it. The latter is almost certainly right. P. 148, n. 1, inadequate reference. P. 158–9 a very clumsily written paragraph. P. 160, in discussing the use of the ridden horse mention should have been made of the Kikones and their mounted men (*Od.* IX, 49). P. 196, the Aigaleos wall is probably not earlier than 600 and is certainly not Mycenaean. S. CASSON.

STUDIEN ZUR GORGO. *By* KAISER WILHELM II. *Berlin : De Gruyter*, 1936. *pp.* 163, *and* 114 *figs.*

This is a striking proof of the Kaiser's extensive researches into archaeology and prehistory, subjects with which he has long concerned himself. The idea

of the book dates from 1911, when the Kaiser personally initiated excavations in Corfu, and found there a Doric stone temple, with a pediment-relief showing a Gorgon between two lions *en face*. Ever since then he has never abandoned the investigation of the origin of the Gorgon-motif. Here he examines its constituent parts, and the way in which the myth took shape. He deals with (1) the half-running, half-kneeling attitude ; (2) the protruding tongue and bird-like form ; (3) the snakes on the neck and at the waist ; (4) the lions *en face*. His investigation was catholic and conducted over a wide area ; figures with similar motifs were traced throughout the world, and as far as possible their origin established both as regards locality and period.

The illuminating suggestion is made that the motif of the attitude may have a cult-origin, being derived from a cult-representation of the rising and setting of the sun. It is supported by reference to the leaping-dance of the priests of Baal (1 Kings, 18), which was a year-ritual, and the representation of the Gorgon as half-running, half-kneeling, is thus symbolic of the sun's movement. The bird-motif is likewise derived from the sun ; in Asia and in N. America the bird is still the sun's special animal and his symbol. The explanation of the protruding tongue of the Gorgon as having originally been a beak is very convincing, and the illustrations, from different cultural regions, give a clear picture of its development.

From this, the connexion of the ' sun-bird ' with the snake can also be explained. The snake, being a creature which comes out of the earth and lives in the earth, is a chthonic element in all mythologies, representing the earth-bound powers that are hostile to the sun. This is why the bird is shown as victorious over the snake, holding it in its beak or devouring it. The lion-motif is traced back to palaeolithic times. The lion is man's enemy conquered by Gilgamesh, fought by Hercules ; it also expresses the hostile powers of Evil, and the ever-recurrent representation of a man between two lions is probably symbolic of man's victory over brute force. Here I cannot go so far as to agree with the author in connecting the lion with the sun : it is more likely connected with the snake-motif—hostile, violent, destructive.

In the first chapter the symbolism of the Gorgon is explained very clearly and concisely. She represents the chthonic sun, and is expressive of the chthonic powers, who are conquered ; her tokens are the snake, the lion, the fierce facial expression, tusks, wings, and running-kneeling attitude. She is the mother of the infernal regions, and as a primeval goddess is later connected with Athene, who bears her signs upon her shield. Next, the author investigates the temple-site itself, and suggests either that the building represents the earth in the form of a mountain (as is especially common in India and Further India, from Borobodur in Java to the temples of Angkor Wat), or that in the temple the world

is expressed as a hollow space. This second idea is the underlying motif of the Greek temples, according to the writer, going back to the pile-dwellings of Celebes and Sumatra. The contrast between these two conceptions is already apparent in the two stylistic groups of palaeolithic art: the franco-cantabrian group aims at the darkness of the cave, the concealing of the structure, while the east-Spanish group seeks the daylight.

The book throws such penetrating shafts of light on problems of myth that it is most stimulating to read. HERBERT KUHN.

ENGLISH VILLAGES AND HAMLETS. *By* HUMPHREY PAKINGTON. *B. T. Batsford*, 1936. *pp.* XVI, 120 *with* 131 *plates and illus.* 7*s* 6*d.*

ENGLISH VILLAGE HOMES. *By* SYDNEY R. JONES. *Batsford*, 1936. *pp.* VII, 120 *with* 136 *plates.* 7*s* 6*d.*

'The Favourite Village' (which in the year 1800 provided the Rev. James Hurdis an exercise for his peculiarly pedestrian muse) is now a commonplace of conversation, and the search for 'quaint old places' has become established as a respectable English pastime. Mr Pakington has produced an illustrated handbook, on a geographical basis, of English villages. The illustrations are excellent, and the introduction, by Mr G. M. Young, is a first-rate but all too short essay, free from irritatingly chatty arty-craftiness.

Mr Jones has approached the subject from the practical architect's standpoint, illustrated with his own drawings, including sketches of architectural details, foot-scrapers, lead cisterns and the like.

There is one aspect of the English village that should be stressed. Delightfully romantic though many a cottage may appear to the passing motorist, few who do not live in the country realize how mossy thatch and irregular timbering may conceal slum conditions. The villagers prefer the comfort and cleanliness of the architecturally shocking Council houses—small wonder if to them the charm of the picturesque seems a little remote and unreal. STUART PIGGOTT.

THE MEDIAEVAL STYLES OF THE ENGLISH PARISH CHURCH. *By* F. E. HOWARD. *Batsford*, 1936. *pp.* 99, *illustrated by numerous photographs.* 12*s* 6*d.*

This volume is published from notes left by the author, completed and prepared for the press by Mr Greening Lamborn.

Mr Howard was an architect with a wide and intimate knowledge and understanding of medieval churches. A valuable chapter is devoted to hints on the study of church development, with advice on the best way to examine an ancient

church. Succeeding chapters deal with the architectural styles up to the Perpendicular, and to a study of the transitional periods between them. There is a glossary of architectural terms, an index arranged under counties, and a page of rather inadequate drawings of mouldings. The illustrations consist of excellent photographs of churches and their details.

A certain number of line-drawings would have been a help in elucidating architectural terms and expressions, and the author seems to be better acquainted with the actual fabric of churches than with their history and literature. It is rather misleading to say that the only sources for Angle-Saxon architecture were Roman and Celtic, with no mention of such intermediate influences as those of Byzantium and the Carolingian Empire. Again, the Norman use of plait-work ornament is thus explained :—' From Celtic and Irish sources came the use of interlacing stems, a sort of plait-work in stone ' thus ignoring both Anglo-Saxon and Scandinavian lacertine sculpture.

In the chapter on transitional Norman work it is a pity to have omitted the characteristic water-holding base, while the description of roofs is rather technical for the non-expert reader, and here a little assistance in the form of drawing would have been welcome. DINA PORTWAY DOBSON.

TERRACOTTAS FROM AFRASIAB. *By* CAMILLA TREVER. No. 93 of the Bulletin (*Izvestiya*) of the Marr State Academy for History of Material Culture. *Leningrad*, 1932. *pp.* 52, XIV *plates.*

Afrasiab is the name given to a mound north of Samarkand, probably the site of the ancient Maracanda. The late Professor N. I. Veselovski dug into it and also acquired the loot from local diggers, and plates were prepared of his collection, which is in the Hermitage. This book furnishes a minimum of historical introduction and a description of these old plates, there is much more material from the site in the Hermitage, the Moscow Museum and at Samarkand. The pieces here published are all terracotta heads or figures or bodies, most of them are said to come from *astodans* or ossuaries, into which bones were put after having been freed from flesh either by the agency of animals or birds, or by direct methods. The types are very various and in them Miss Trever recognizes various Central Asian peoples, Iranians, Tokhars (!), Turks and ' Scythians '. It has been suggested that the figures represent the *fravashes* or guardian angels of the deceased, but musicians, mourners, dancing girls and animals would look more as if they were to be directly useful in the next world. It is a great pity that Miss Trever did not give us a picture of one or two *astodans* in her introduction, so as to show what they are like : she says that those in the Hermitage do not seem to offer place for the terracottas. That certainly seems

to be true of the astodan figured by Kondakov, Tolstoi and Reinach, *Ant. de la Russie Méridionale*, p. 359, f. 318 : this reference, the most useful to a foreigner, is not given in the Bibliography.

When the rest of the material is published, it will throw some light on the civilization of Eastern Iran in the first five centuries of our Era, with its mixture of Greek, West Iranian, Indian and Nomad influences, but from their setting these heads and bodies do not give us much satisfaction. ELLIS H. MINNS.

Books Received

ALFORD, VIOLET. Pyrenean Festivals. Chatto and Windus, 1937.
ALGEMEENE GIDS. Allard Pierson Museum, 1937.
ALTHEIM, FRANZ. History of Roman Religion. Methuen, 1938.
ANTIOCH ON THE ORONTES. II. THE EXCAVATIONS 1933–36. (Publications of the Committee for the Excavation of Antioch). Princeton : University Press. London: Oxford University Press, 1938.
ARENSBERG, C. M. The Irish Countryman : an anthropological study. Macmillan, 1937.
ASSYRIAN SCULPTURES IN THE BRITISH MUSEUM : FROM SHALMANESER III TO SENNACHERIB. London, the British Museum, 1938.
AUBERT, MARCEL. Stained Glass of the XIIth and XIIIth centuries from French Cathedrals. Batsford, 1938.

BARNES, A. S. Christianity at Rome in the Apostolic Age. Methuen, 1938.
BERGSØE, PAUL. Metallurgy and technology of Gold and Platinum among the pre-Columbian Indians. Danmarks Naturvidenskabelige Samfund, Vimmelskastel 32, Copenhagen. 1937.
BING, JUST. Fra Trolldom til Gudetro : studier over Nordiske Helleristninger fra Bronsealderen. Oslo : Jacob Dybwad, 1937.
BRUNSTING, H. Het Grafveld onder hees bij Nijmegen. University of Amsterdam, 1937.
BRUT Y BRENHINEDD : COTTON CLEOPATRA VERSION. Ed. and trans. by J. J. Parry. Med. Acad. of America, Cambridge, Mass., 1937.

CAMBRIDGE ANCIENT HISTORY. Vol XI. The Imperial Peace, A.D. 70–192. Cambridge University Press, 1936.
COLE, F. C. Rediscovering Illinois : archaeological explorations. University of Chicago Press, 1937.
CRAWFORD, D. M. C. The Conquest of Culture. New York : Greenberg, 1938.

DEXTER, T. F. G., and HENRY. Cornish Crosses. Longman, 1938.
DUTTON, RALPH. English Garden. Batsford, 1937.

EPHEREMIS DACOROMANA : ANNUARIO DELLA SCUOLA ROMENA DI ROMA. Vol. VII, 1937.

FITZHUGH, T. The Indo-European accent. University of Virginia, Charlottesville, 1937.

GEOLOGY AND ARCHAEOLOGY OF THE VAAL RIVER-BASIN. Union of South Africa, Dept. of Mines, No. 35, 1937.

GOLDMAN, SOLOMON. The Golden Chain : Torah and earlier Prophets. New York : Beloch Publishing Co., 1937.

HANDBOOK OF LATIN AMERICAN STUDIES. Harvard Univ. Press, 1937.

HEAPE, E. G. Georgian York. Methuen, 1937.

INTERNATIONAL DIRECTORY OF ANTHROPOLOGISTS. National Research Council, Washington, 1938.

LEWIS, E. A. Early Chancery proceedings concerning Wales. University Press Board, Cardiff, 1937.

MACALISTER, R. A. S. Secret languages of Ireland. Cambridge University Press, 1937.

MALTWOOD, K. E. Air view supplement to ' A Guide to Glastonbury's Temple of the Stars '. London : J. M. Watkins.

MERITT, D. B. Documents on Athenian Tribute. Harvard University Press, 1937.

PARROT, ANDRÉ. Le ' Refrigerium ' dans l'au-delà. Paris : Geuthner, 1937.

PERROT, NELL. Les reprèsentations de l'arbre sacré sur les monuments de Mésopotamie et à Èlam. Paris : Geuthner, 1937.

PETRIE, FLINDERS, and J. C. ELLIS. Anthedon, Sinai. British School of Archaeology in Egypt, 1937.

PROGRESS OF THE WORK OF THE ORIENTAL INSTITUTE IN IRAQ, 1934–5. University of Chicago Press, 1937.

QUENNELL, M. and C. H. B. Everyday life in Roman Britain. Batsford, 2nd ed. revised.
—— —— Everyday things in England. Vol. 2, 3rd ed. Batsford, 1938.

RADIN, PAUL. Primitive Religion. Hamish Hamilton, 1938.

RICE, D. TALBOT. The Icons of Cyprus. With chapters by R. Gunnis and T. T. Rice. Allen and Unwin, 1938.

ROYAL COMMISSION ON HISTORICAL MONUMENTS, ENGLAND : INVENTORY OF THE HISTORICAL MONUMENTS IN MIDDLESEX. H.M. Stationery Office, 1937.

ROWE, ALAN. Catalogue of Egyptian scarabs, scaraboids, seals and amulets. Cairo : Institut Français d'Archéologie Orientale. 1936.

SCHOFIELD, J. N. Historical background of the Bible. Nelson, 1938.

SOCIÉTÉ JERSIAISE, BULLETIN ANNUEL, 1937.

STIBBE, E. O. Introduction to physical Anthropology. Arnold, 1938.

WALES, H. G. Q. Towards Angkor. Harrap, 1938.

WETHERED, H. N. Mind of the ancient World. Longmans, 1937.

WOODWARD, J. M. Perseus : a study in Greek art and legend. Cambridge University Press, 1937.